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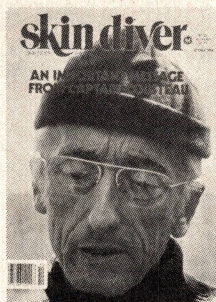
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skin diver

Volume Twenty-Seven Number Ten

COVER

Pioneer diver/explorer/scientist Captain Jacques-Yves Cousteau gives SKIN DIVER readers a firsthand account of our rapidly deteriorating marine environment. In Cousteau's words, "We divers are witnessing the demise of the precious wilderness we discovered." For the full story, turn to page 40.



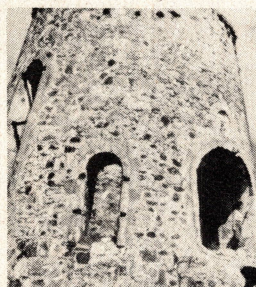
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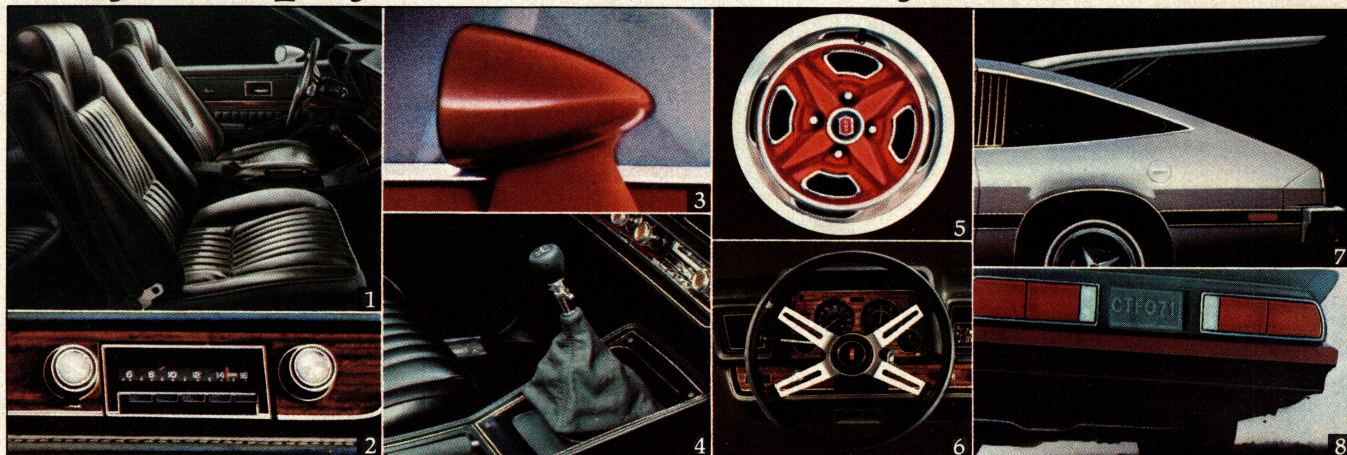
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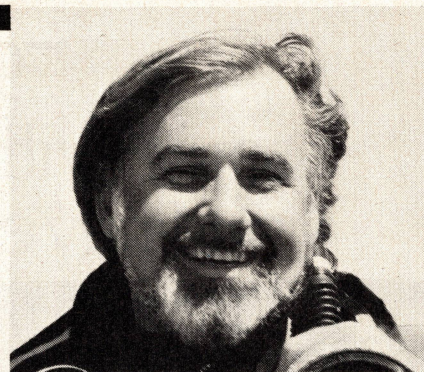
†In Calif. 5-speed available with 3.8-l. V6 only.



Editorial

WHO IS KILLING OUR OCEANS?

BY THE PUBLISHER



By nature, all divers are basically conservationists. We love the beauty and the wildlife of the underwater world in which we swim, and therefore feel an urge to protect it from harm. Yet, we watch it disintegrate before our very eyes. Good visibility turns to bad, living reefs become wastelands, and marine life grows smaller and fewer in numbers. Who is to blame and how can we stop it?

Over the years, spearfishermen have shouldered much of the burden of blame. People have confused spearfishing with pollution and have unfairly labeled the spearfisherman as a "bad guy" in our hour of ecology crisis. The situation is unfortunate for spearfishermen are being wrongly blamed for the errors of mankind. Spearfishermen are divers, too, and they love the sea just as much as any other diver. They are equally concerned with the diminishing fish population and experience the same frustration over the general deterioration of our oceans.

This is not to say that every fisherman is lily white, for every group has its share of good and bad. We are all aware of those unforgivable acts which tend to give any group of sportsmen a black eye. We have all heard stories about the insensitive spearfisherman who has knocked off someone's pet grouper, stupidly speared a helpless angelfish or systematically wiped out a small reef area just to satisfy an ego. What we don't realize is that such intolerable acts are equally offensive to the majority of spearfishing sportsmen. They hate to hear of these incidents just as much as the conservationists.

The real issue at hand is: Exactly who is killing our oceans? Who is responsible for the steady decline and deterioration of our marine life? By comparison, the actual effect of all the spearfishermen in the world combined is merely a drop in the bucket. If spearfishing were completely banned today and all spearguns destroyed, the situa-

tion would not change one bit. Our marine life would continue to die and our fish populations would continue to diminish at alarming rates. So if the spearfishermen are not to blame for our present conservation crisis, who are the real culprits?

Let us briefly examine some of the major killers which continue to induce a slow and agonizing death to our seas:

MUNICIPAL SEWAGE — Mankind, collectively, is the number one murderer of our lakes, rivers, and oceans. The poisons contained in his own waste become a deadly killer of the undersea environment. Big cities are the worst offenders, for their daily dosage of half-treated sewage amounts to millions of toilet flushings which eventually find their way to the sea. Most urban communities do not have adequate sewage treatment plants which effectively filter out all of the contaminants which can kill an ocean reef or totally destroy a lake bottom. The construction of sewage treatment plants is not as glamorous as the building of a civic center, sports stadium or new freeway. Although city planners and local politicians are fully aware of the destruction being caused, they continue to ignore or fight any proposals for improved, expanded sewage treatment facilities. Laws don't help much because of political and legal manipulation inside government. Our rivers have become open sewers, our lakes are little more than holding ponds filled with poison, and our oceans are becoming the giant toilet bowl of mankind. Don't kid yourself, sewage contamination is killing fish and shellfish by the millions.

HEAVY INDUSTRY — Improper sewage treatment is only the tip of the iceberg when it comes to pollution. Industrial plants and manufacturing facilities continue to dump highly toxic organic and metallic wastes into our public sewage systems, rivers, and oceans. Most of these poisons are in-

visible and therefore not noticed by the public; yet they attack the chain of life in our seas at virtually every level.

The Minamata tragedy is the classic case of industry poisoning the sea. A Japanese fertilizer manufacturing plant not only polluted the ocean but also actually killed and crippled more than 1000 people in a nearby fishing village. The Chisso Company dumped tons of mercury-laden wastes into the sea. This highly toxic metallic compound was absorbed by the shellfish and fish of the area and eventually passed onto the people who ate these freshly caught foods. It took more than 25 years for scientists and the people of Minamata to bring Chisso to court and win their case. Meanwhile, many died or suffered unspeakable agony because of poisoning by just one manufacturing plant. The most frightening aspect of industrial pollution is that few companies are ever stopped or prosecuted. Big business does not give in easily. Stalling and legal maneuvering are common tactics for putting off the environmentalists and the Environmental Protection Agency.

AGRICULTURE — Modern farming benefits greatly from chemical compounds such as pesticides, fertilizers, and weed killers. While these technological marvels have greatly improved the country's agricultural productivity, we pay a heavy price in other, less apparent, ways. Many of these organic compounds are extremely toxic. And rainwater falling upon our farmlands helps to carry these poisons into our rivers, lakes and oceans. Even though we have scientific evidence of the damage being done, it is hard to convince a farmer that he is destroying the ocean.

LAND DEVELOPERS — Land developers are theoretically in the business of improving our land areas with housing projects, shopping centers, marinas, and resort communities. Unfortunately their construction efforts often result in a much greater destruc-

(Continued on Page 38)

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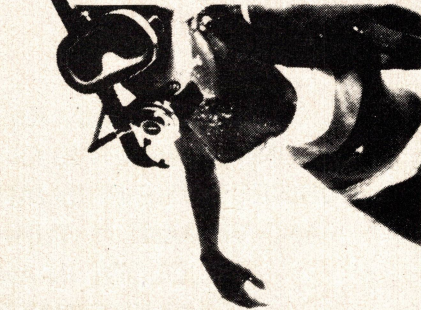


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Underwater Forum



The Real Victims

In my opinion, sharks are the *real* victims and they have been since *JAWS* was first published.

WARREN M. SALERNO
CLIFTON, NJ

The Battle Rages

The Delaware Valley Diving Council is a non-profit organization designed to better the sport of scuba diving in the mid-Atlantic region. The main purpose of our council is "to promote the use of our rivers, lakes and ocean in such a manner as to preserve their natural states." Our membership consists of 27 clubs and supporting organizations.



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Our supporters number approximately 4300 members.

We have, for some time, been involved in the battle to end ocean dumping, not because we are environmentalists or scientists, but because we see the effect of dumping on the ocean floor. Sport scuba divers reported waning lobster catches and bottom fish depletion two years prior to the massive algae bloom and resulting fish kill of 1976. Two months prior to the fish kill, our divers told the Environmental Protection Agency and the Department of Environmental Protection of New Jersey that fish were sick and all bottom life was dying. The EPA told the divers not to worry since it was only a local phenomenon.

That "local phenomenon" wiped out over 3000 square miles of ocean bottom life off the coast of New Jersey — which also became known as the largest single pollution disaster in the history of the country. The citizenry did not worry until the black odorous slime (a mass of dead algae known as *Ceratium tripos* plus fish carcasses) washed ashore. Those of you who live near the ocean know it doesn't smell like it used to, and you well remember the stench that came from the ocean off New Jersey in 1976.

Our council sent divers to the ocean bottom in February to take bottom samples. Those of you who received a bottle sample in the mail know what we found. The sludge does not disperse 100 percent as we have been told. Instead, it *accumulates*.

To get to the point, we are almost out of funds to continue our fight against ocean dumping and pollution of our waters. We need your help, desperately. We need our ocean for a major source of food. We must protect this valuable resource. We need the ocean as a place for recreation. No one wants to swim in a sewer: not the divers who love the U/W world, nor the children who look forward to their summer seashore vacations.

Your contribution, large or small, enables us to inform more people of what we find. The public has to be made aware of what is going on, if we are to get the support we need to win this battle, and this takes money. Groups such as ours must continue to fight for a cleaner ocean for all. Send your contributions (large or small) to:

DELAWARE VALLEY DIVING
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Diver Awareness

As a northwest diver I see a lot of beautiful sea life left untouched. However, I see more that has been abused by my fellow divers.

Just a few days ago on a dive in lower Hood Canal, Washington, I ran into a

(Continued on Page 12)

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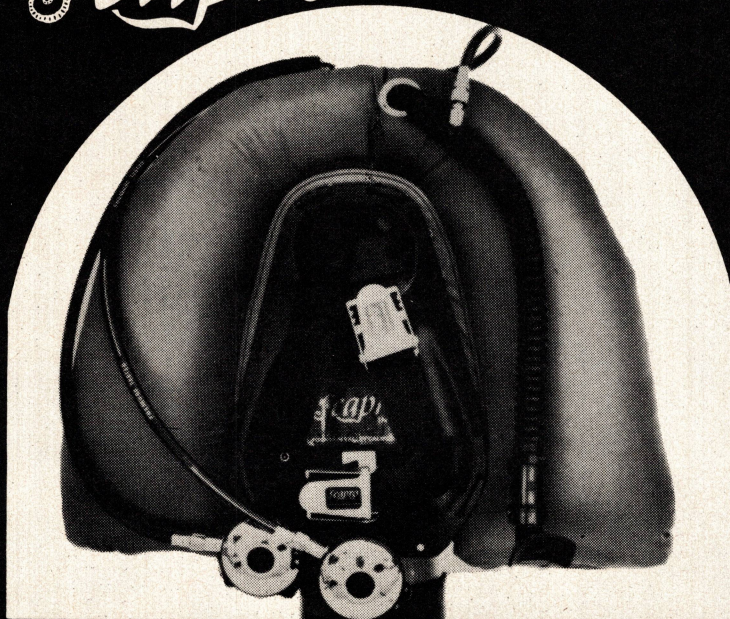
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SCUBAPRO BCP	NO	NO	YES	NO	NO	NO	NO	NO	NO
SPORTSWAYS HYDRONAUT	NO	YES	NO	NO	NO	NO	NO	NO	NO
U.S. DIVERS CALYPSO COMPENSATOR	NO	YES	NO	NO	NO	YES	NO	NO	NO
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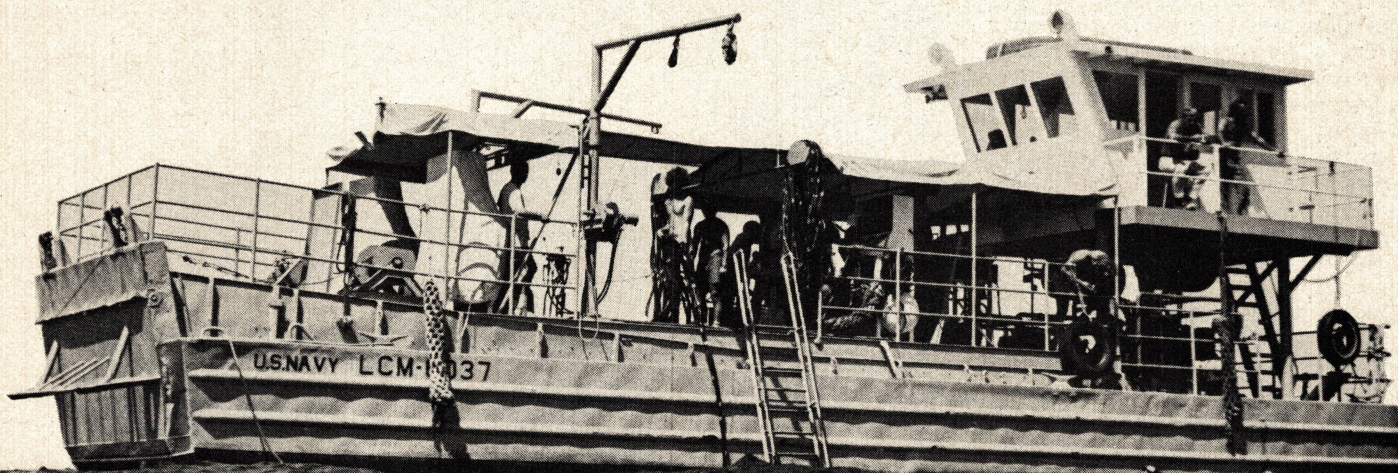
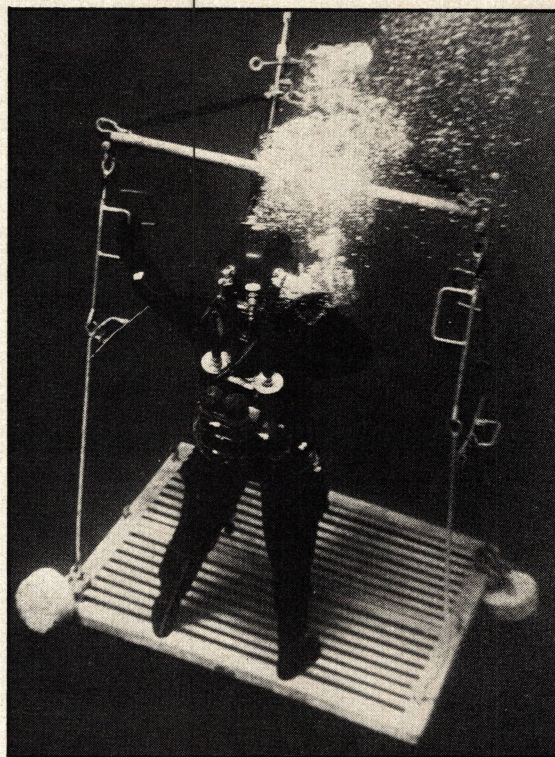
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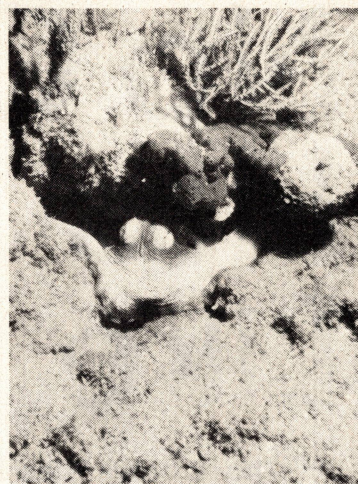
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SDRP 10/78



the Lobster and the Octopus

BY RUDE JACKSON



photographs by Rude Jackson

Six of us were diving the outer Breakers Reef off Palm Beach. Two of the spearfishermen came up empty handed on our first dive and we decided to try a shallow reef we hadn't been to in a couple of years.

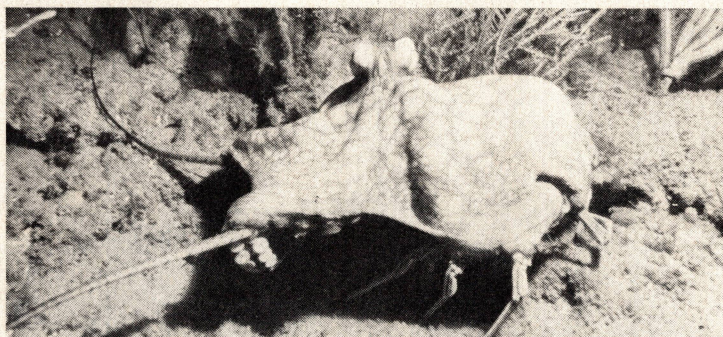
The reef was short, just 50 yards long and in 20 feet of water. The spearfishermen entered the water and headed north. My dive buddy and I headed south.

Just as we left the anchor line, I saw and caught a lobster, then we continued on down the reef. Soon it tapered off into a grass and sand bottom. It was in this area that I spotted the eyes of an octopus peering out from a small, ledge-like crack.

I tried to prod the octopus out for a picture-taking session, but it had no intention of cooperating. Then I remembered my lobster. I put it about three feet from the hidden octopus. The lobster immediately departed the scene in the wrong direction. Catching it once again, I put it back at the original starting point, but this time I blocked its escape route with my body.

The lobster walked within two feet of the octopus and it looked as if it would make good its escape. But, as if equipped with radar, the octopus' eyes peeked up from its crevice. Almost before I could click the shutter, the octopus made a beautiful, one-handed grab, pulling the lobster over and off balance. It then acted as if it were a machine set on automatic capture. Two, three, four, then five, six, seven and eight arms secured the prey.

The octopus now had a problem: Wrapped around the lobster, it was too big to get back into its hideout. However, I had now used all of the remaining nine frames of film in my camera. I gave the octopus a pat on the head and headed back to the anchor line, leaving my photogenic subject alone with a well-deserved meal. 🦑



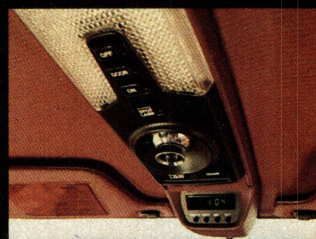
A shy, retiring carnivore, the octopus moves fast when dinner comes along. With a larger and more complex nervous system than any other mollusk, it is alert, intelligent, and a favorite subject for U/W photographers. The hapless lobster seems to be on everybody's menu.



Sheer pleasure from Plymouth.



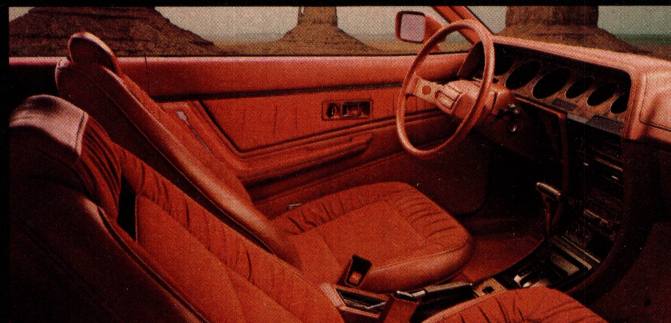
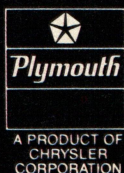
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Nikonos III by Nikon

UNDERWATER FORUM

(Continued from Page 6)

few divers who were cuddled around a rocky ledge. One of them waved at my buddy and I, so we approached them to see what they had found. When we reached the divers, one of them pulled his knife out of the crevice, then a severed octopus tentacle. He had a very big smile on his face. The octopus did not. Later he stated that he did not believe that he had hurt the animal. Another diver however, found the octopus nearly dead about 30 minutes later.

Nudibranchs are another mistreated animal. Many a diver has picked one up to closer inspect its beauty, only to squish it. Too many fish are speared only for sport. Placing sand and rocks in sea anemones and turning starfish upside down aren't nice either.

My point is that most divers do not realize the amount of harm that can be done to the underwater environment on a single dive. As divers, though, we can also help the environment. . .

We need to push for more legislation that will protect all marine life. We also need to push for sea life preservation to be taught in basic scuba courses. And, what is most important each diver [must] think about the ecosystem before he handles marine life.

JIM MILLER
LEBANON, OR

Florida's Little Bahamas

I would like to comment on the article in the May issue about Reef Diving off Palm Beach. It seems that the author [Rick Frehsee] has been misinformed. I have been diving on almost all of the reefs on our coast and that includes the Breakers, the Double Ledges, and the Cable Crossing which are the only ones mentioned in the article.

It really bothers me that whoever informed the author about the places to dive off Palm Beach County would send him to the area he mentioned and tell him that this was the best we had to offer. In the south end of the county, about 15 miles south of the area mentioned, is a reef area known as the Delray Ledges. This area is quite large and is called, by the ones who dive it on a regular basis, "The Little Bahamas". . . Dive shops that run the trips to these reefs are Florida Divers Service and The Inlet Dive Shop.

DAVE SHOEMAKER
BOYNTON BEACH, FL

BC's With Ponies

In response to BC Dispute [U/W Forum, SDM July, 1978] I would like to clarify some of the statements made by both Mr. Michelson and Mr. Tubbs. Certain of your readers who are unfamiliar with the Fenzy, Gilet, and Nem-

(Continued on Page 16)

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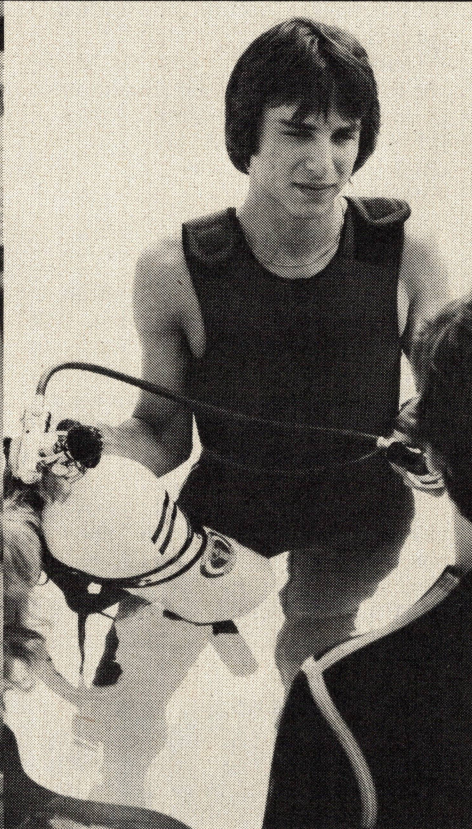


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UNDERWATER FORUM

(Continued from Page 12)

rod/Seamco vests equipped with auxiliary pony bottles could be a bit confused over the differing opinions expressed in this article.

One of the statements in Mr. Michelson's reply was, "Contrary to what Mr. Tubbs tells us and contrary to what is stated in the instruction manual packed with each Fenzy, the pony bottle is not to be used to achieve neutral buoyancy. This bottle is for emergency ascents and breathing only." Mr. Tubbs stated in his response that if Fenzy did not recommend this procedure there must be a reason. This is clearly more of a difference in diver opinion than a lack of knowledge on either part.

The instruction manuals of these units all recommend their use as buoyancy control devices using the pony bottle, but also acknowledge their use as auxiliary breathing devices *after proper training only!* The choice is simply up to the diver. But why have an auxiliary pony bottle when you drain it during buoyancy control, thus eliminating your emergency air supply?

Mr. Tubbs also states that one of the major drawbacks to this type of system is that the oral inflation hose must be removed and air expelled from the

nose or mouth. This shows a surprising lack of knowledge on Mr. Tubbs' part. The Fenzy and the Gilet both use a type of breathing mouthpiece which allows air to flow directly from the BC to the diver to the water through a special inhale/exhale diaphragm. The Nemrod/Seamco (#99-6718) uses a push/pull system with a purge valve located near the mouthpiece through which air is expelled. This valve must be covered during breathing and normal buoyancy control making this unit more difficult to get accustomed to.

Lastly, I would like to ask Mr. Michelson to please send me a manual from the German Diving Federation.
J. MARK MCCLANAHAN
631 E. Call St., Apt. 409
Tallahassee, FL 32301

Jellyfish Facts

[Regarding] an article written by Vesta Rea-Salisbury [SDM May, 1978] on Freshwater Jellyfish . . . Ms. Salisbury states that "unlike the marine jellyfish, the freshwater variety has a velum." This is not true. Many species of marine "jellyfish" possess veli, such as *Velella* or *Obelia*.

The problem probably lies with the fact that the common term "jellyfish" has been used to describe all medusae (free swimming forms) within the phylum Cnidaria. Members of the class Scy-

phozoa typically do not possess veli and, being the more conspicuous, may have led to this misunderstanding.

In addition, Ms. Salisbury states that "the polyp stage (of *Craspedacusta sowerbii*) is actually a colony of many living polyps lacking tentacles." This is also not correct, as *Craspedacusta* has a solitary polyp stage with reduced tentacles.
RALPH J. TELLA
BOSTON, MA

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SDM'S NATIONAL SCUBA EXAM

By Dennis Graver

Category: Kelp Diving

Divers descend beneath kelp along the Western coast of the U.S. and in other parts of the world. While the beautiful kelp forests contain a thousand more times life than an equivalent land area, there are specific techniques needed for diving in and around this algae. Test your knowledge of kelp diving techniques by answering the following questions. Answers are on the next page.

1

Kelp is of little use or value to divers.

- ☐ A. True
- ☐ B. False

2

When diving in kelp, a dive knife should:

- ☐ A. Be worn on the outside of the leg
- ☐ B. Be worn on the inside of the leg
- ☐ C. Not be worn in most instances
- ☐ D. Held in the hand for kelp cutting

3

When entering the water into kelp from a boat, the regulator should be:

- ☐ A. Held tightly in the hand
- ☐ B. In the diver's mouth
- ☐ C. Secured with a neck strap
- ☐ D. Secured to the side of the tank

4

Surface swimming over kelp is easiest if you:

- ☐ A. Swim with a crawl stroke using your arms
- ☐ B. Turn on your back and use wide kicks
- ☐ C. Can place something beneath you to act as a buffer
- ☐ D. Cut a path ahead of you using your dive knife

5

For the easiest descent in a kelp bed, a scuba diver should perform which of the following:

- ☐ A. A head-first surface dive from the pike position
- ☐ B. A head-first surface dive from the tuck position
- ☐ C. A feet-first surface dive with an initial scissors kick to lift and provide downward momentum
- ☐ D. A feet-first surface dive initiated by exhaling and sinking

6

To avoid entanglement in kelp underwater:

- ☐ A. Swim only along the edge of the kelp bed
- ☐ B. Push strands beneath you rather than swimming under them
- ☐ C. Have a more experienced diver lead the way
- ☐ D. All of the above

7

If you should become entangled while underwater, you should:

- ☐ A. Work slowly and calmly to free yourself
- ☐ B. Wait quietly until your buddy comes to free you
- ☐ C. Cut yourself loose with your dive knife
- ☐ D. Drop your weightbelt and/or inflate your BC

8

If entangled in kelp, which of the following actions is least desirable:

- ☐ A. Signaling your buddy for assistance
- ☐ B. Rotating to see the cause of the problem
- ☐ C. Removing your tank to clear the kelp
- ☐ D. Sinking to drop clear of the floating strands

9

Which of the following is true concerning deep water kelp?

- ☐ A. It is stretchy, breaks easily when bent sharply, and cuts easily
- ☐ B. It does not stretch, breaks only with great difficulty, but cuts easily
- ☐ C. It is stretchy, cannot be broken, and is difficult to cut
- ☐ D. None of the above

10

Which of the following items of equipment are of special value to a kelp diver:

- ☐ A. An underwater light
- ☐ B. A dive compass
- ☐ C. A dive knife
- ☐ D. All of the above

SDM'S NATIONAL SCUBA EXAM

1

B. False. Kelp is quite useful to a diver. It can be used to gauge visibility and current, as a vertical reference, and to aid in descending. It also makes for more interesting and beautiful dives than kelp-free areas.

2

B. Be worn on the inside of the leg. To avoid snags when swimming through kelp, streamline yourself. Try to eliminate places where kelp strands could catch, such as loose fin strap ends, stacked weights on weightbelts, or a knife worn on the outside of the leg.

3

B. In the diver's mouth. Upon entry it is possible to go below the surface and become caught in kelp as you bob up again, being held just below the surface until you free yourself. With air to breathe this situation is not serious, but without air it can be.

4

C. Can place something beneath you to act as a buffer. Raising the arms out of the water wastes energy and swimming on your back in kelp is the worst possible position for a scuba diver. A pole spear, surf mat, or surface float beneath you will allow you to skim over the kelp.

5

D. A feet-first surface dive initiated by exhaling and sinking. The object is to get below without becoming entangled and without exerting any more energy than necessary. By sinking feet first, entanglements are minimized, orientation is excellent, and little energy is expended.

6

B. Push strands beneath you rather than swimming beneath them. The tank valve and regulator assembly is the area most prone to catch on kelp underwater. Keep this area clear of the kelp and other entanglements will be minor.

7

A. Work slowly and calmly to free yourself. Rapid, jerky movements often compound the problem, and an excited diver usually isn't a thinking diver. Analyze the situation, determine the best solution, and then take controlled action.

8

B. Rotating to see the cause of the problem. Turning in kelp is a great way to snag the tank valve and regulator and worsen the situation. Since kelp floats, you can sometimes free yourself by sinking out of it, and buddy assistance or tank removal are also good methods to use.

9

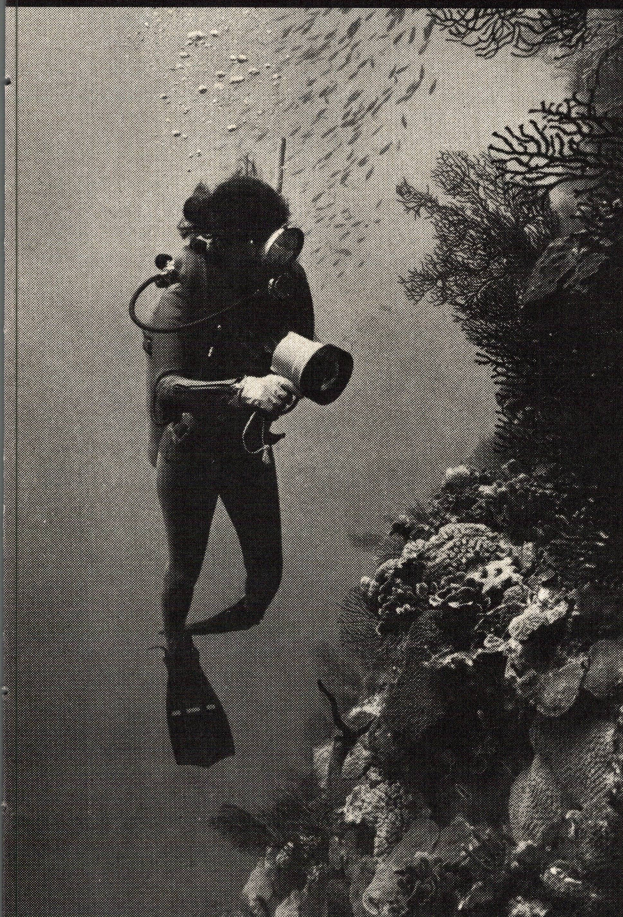
A. It is stretchy, breaks easily when bent sharply, and cuts easily. Kelp can be snapped in two, easily bitten through, and cut with ease. The least favorable action is to pull on kelp to break it, as it is somewhat elastic and difficult to break in this manner.

10

D. All of the above. Reduced light from the kelp canopy overhead makes a light useful for peering under ledges and into holes; a compass is useful for navigating beneath the kelp; and a dive knife is of value because fishing line is frequently encountered in kelp areas.

Kelp diving is beautiful, interesting, and quite safe — if you are familiar with the correct techniques for diving in this algae. As with any new environment or condition encountered in diving, seek an orientation before trying it on your own. Find out how to avoid problems in diving and you will rarely have any! I hope those who dive in kelp scored well on this exam and that those unfamiliar with the techniques of kelp diving better understand the need for kelp diving orientation.

The more you know --- the better you feel



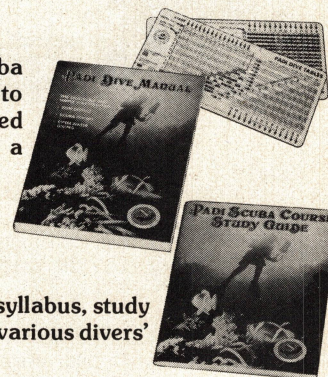
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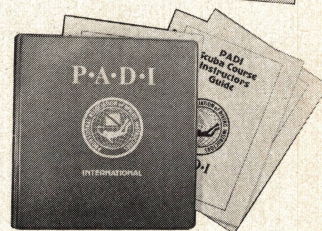


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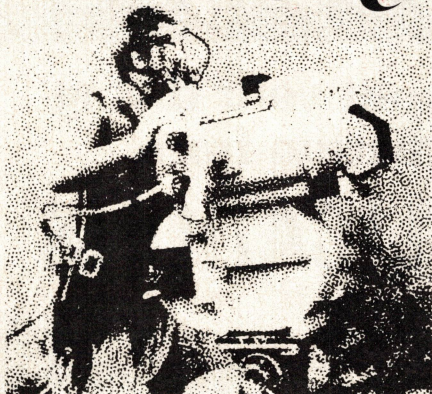


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October 6-8

Great Lakes Dive-In, Lake Geneva, WI (Contact: Aqua Center Inc., 717 Morton Ave., Aurora, IL 60506)

October 14

6th Annual Sub Sea 78 Symposium, U.S. Coast Guard Academy, New London, 9 a.m.-4:30 p.m. seminars; 7 p.m. film review (Contact: Charles Dennis, U.S. Coast Guard Academy, New London, CT 06320)

October 21

Women & Diving Conference, Wellesley College Science Center, Wellesley Mass. Sponsored by Aquawoman NAUI (Contact: Valerie Costelloe, East Coast Divers, 213 Boylston St., Brookline, MA 02146)

October 21

1st Annual Fresno U/W Film Festival: "An Evening with Jack McKenney & Friends." Wilson Theater, 1455 Fulton St., Fresno, 8 p.m. (Contact Fresno U/W Film Festival, Box 804, Fresno, CA 93712.)

November 4

16th Annual Underwater Film Festival, Bovard Auditorium, Univ. of Southern California (Contact: Underwater Photographic Society, PO Box 7088, Van Nuys CA 91409)

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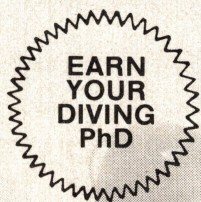
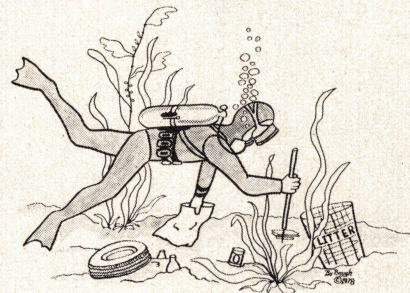
2nd Annual Aqua Space 78, sponsored by Aquatic Exploration and Research Associates, Math Bldg., Univ. of Windsor, Windsor, Ont., Canada (Contact: Jocelyn Goodwin, 3147 California Ave., Windsor, Ont., Canada N9E 3K5)

January 20

Entry deadline Illinois Council photo contest (Contact: Jan Weber, 1211 Market St., DeKalb, IL 60115)

March 3

Sea Rovers '79 / Boston Sea Rovers 25th Annual U/W Clinic, Boston University & John Hancock Hall (Contact: Bunky Hodge, 174 Beech St., Rockland, MA 02370 (617)-878-8710)



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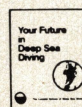
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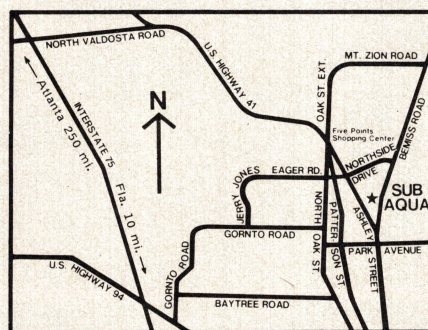
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SKIP BREATHING

BY CHARLES V. BROWN, M.D.

The bottom's terrific. You have only one tank, and the nearest air station is a long way off. So you skip breathe. Or maybe you just hate to run out of air before your buddy does. Take a breath, skip a breath, take a breath.

Skip breathing is the diver's terminology for what physiologists would call deliberate hypoventilation — that is, purposely breathing less than you normally would for a given activity. It stretches your tank all right, but you pay a price. To see what the price amounts to, we'll need to look at the several distinct purposes which breathing serves, and how they are affected by the U/W environment.

First, breathing provides charges of air that can be expelled in useful ways. Inhaled air enables kids to blow out candles, musicians to blow horns, and the rest of us to talk. No problem here, as none of these are commonly attempted underwater.

Second, expanding the chest not only pulls air into the lungs, it pulls blood into the heart. Because the lungs are elastic, when expanded they tug outward on the sides of the mediastinum, expanding the heart and sucking in venous blood. This aid to circulation is important for a person standing upright on land, where gravity opposes return of blood from veins below the heart. It is far less important U/W, where gravity is largely negated.

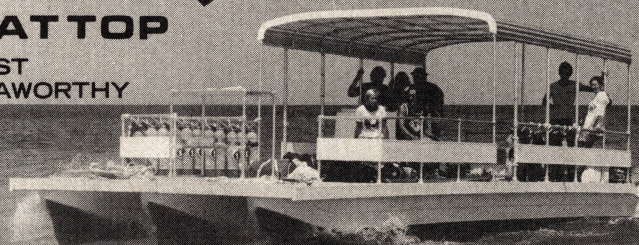
Third, breathing according to one's natural urge supplies oxygen at a rate appropriate for the activity at hand. Skip breathing would ordinarily leave one short of oxygen, but underwater this is offset by the increased partial pressure of oxygen.

Fourth, breathing regulates the level of CO₂ in the blood by continually removing any excess. Here, finally, lies the real penalty of skip breathing — the body retains CO₂. The partial pressure of CO₂ in arterial blood is normally 40mm of mercury. As it rises, unplea-

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sant things begin to happen. A level of 60mm is bad and, at 80mm, one verges on coma. Scuba diving aggravates the usual disadvantages of CO₂ retention and adds more of its own. Let's see what these are.

Excess CO₂ is not all carried in simple solution. Much of it reacts chemically with water to form bicarbonate ion and hydrogen ion. The hydrogen ion causes acidosis. In the acidotic state, biochemical reactions that support life become less efficient, and the diver becomes weakened.

CO₂ is a strong vasodilator, and this can also cause trouble. The body has far more blood vessels than there is blood to fill them at any one time. Normally, most remain inactive until flow is required. As the CO₂ level in any given area rises, it causes vessels to dilate, admitting a flow of fresh blood to set things right. But when the CO₂ level is kept artificially high throughout the blood stream, control breaks down. Vasodilation becomes too widespread, and blood pressure falls. Blood flows where it's not needed, reducing the flow to areas of maximal need, such as hard working muscles.

Increased flow of blood through the skin carries body heat from the interior to the surface, where it is readily lost. This of course impairs the body's prime defense against hypothermia.

Increased flow of blood to the brain

favors oxygen toxicity. The danger of high partial pressures of oxygen at depth is normally reduced because the oxygen has a vasoconstricting effect, slowing blood flow to the brain. But high CO₂ dilates the vessels, ruining this protection, and oxygen convulsions occur at a lesser depth than would otherwise be the case.

The evils of excess vasodilation mentioned so far may be appreciated intellectually, but there is another with which many divers have become painfully familiar. It is the well known CO₂ headache, caused by dilation of vessels in the membranes covering the brain.

CO₂ is also a potent narcotic. We've mentioned that doubling its normal level can knock a person out. The risk is magnified by depth, for the effect of CO₂ is additive with that of nitrogen in producing narcosis.

Finally, CO₂ predisposes to decompression sickness. It apparently favors the formation and/or early expansion of tiny bubbles. And once a bubble is formed, regardless of its composition, all dissolved gases will flow into it until partial pressure equilibrium is reached between the bubble and the solution. A high CO₂ level therefore means bigger bubbles. Indeed, it has been reported that if a working diver will simply hold still and rest for one minute before starting his ascent, he's much less likely to get bent.

If a sport diver has pushed the tables, his ascent should be very relaxed. Kicking hard to overcome negative buoyancy, or to lift a bag of goodies, invites bubble trouble. Judicious use of buoyancy control in such situations is definitely helpful. And mild hyperventilation — breathing more than seems necessary just before and during the ascent — adds an additional safety factor.

The savvy diver stretches his bottom time in ways that don't rely upon skip breathing. He uses an efficient pattern of breathing, deeper and slower than topside, so as not to waste energy in moving air back and forth through the dead space in the regulator and the lung's air passages. He hangs loose, relaxed rather than tense. He dresses for efficient thermal protection, to avoid both cold-induced hyperventilation and energy wastage by shivering. He utilizes the most efficient means of propulsion: Kick and glide rather than simply pumping fins; or crawl hand over hand across the bottom; or ride the surge. And he maintains precision control of his buoyancy to avoid wasting energy in kicking up or down.

Breathing is the most urgently essential activity of life over which we have any control. Holding one's breath is something like dying a little. So skip a meal, skip a jacket, skip a buddy if you must. But don't skip breathing.

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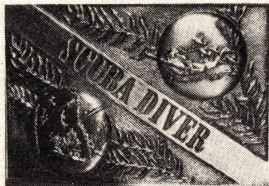
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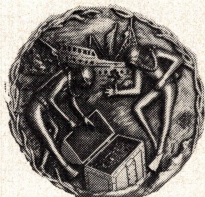
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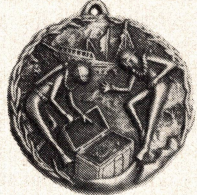
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Shell Collector's Notebook



BY E. R. CROSS

This column is designed for those who wish to improve not only the quantity of shells in their collections but also the quality of and knowledge about those shells. Toward this basic purpose the column will provide non-technical, but scientifically accurate, information on all aspects of shells and shelling. Shell Collector's Notebook is your column. Questions, comments, requests for ID photos of shells, anything related to shells or shelling will be welcome from SDM readers.

For questions and comments used in this month's column I would like to thank Martin S. Dick, Closter, NJ; Barry R. Berkey, Fairfax, VA; Donald K. Ross, St. Louis, MO; John Caceres, New York, NY; J. P. Morse, Tiverton, RI; Bob Nixon, Wilmington, NC; and Ricardo Romero Lara, Mazatlan, Mexico.

FOLLOW-UP ON CHARONIA TRITONIS

A few readers have written about sighting *Charonia tritonis*. Their reports are greatly appreciated.

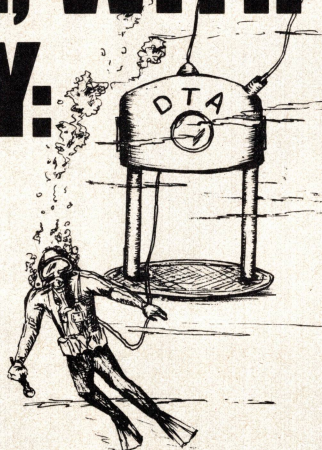
Not all of the reports were actually of that shell. One reader wrote, "I have observed and collected a live triton while snorkeling off the beach on West End, Grand Bahama Island in the Caribbean." A second reader wrote a similar letter describing a sighting at Trellis Bay at Beef Island in the Caribbean. He said, "I saw it among numerous sea urchins and starfish on a mostly sandy bottom (with no appreciable coral within several hundred yards) in about 15 feet (4.6m) of water. In the same area there were numerous West Indian fighting conchs (*Strombus pugilis* Linne, 1758), queen conchs (unknown), a few beautiful milk conchs (*Strombus costatus* Gmelin, 1791), and several king and emperor helmets (*Cassis tuberosa* Linne, 1758 and *Cassis madagascariensis* Lamarck, 1822). We

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also saw three or four murex shells in the same area."

First, I would like to point out that *Charonia* found in the Caribbean (South-east Florida, West Indies, Brazil and Bermuda) are not the same shell as the Pacific triton (*Charonia tritonis*) described in the May Shell Collector's Notebook. However, I do appreciate the information submitted on the Atlantic species as they are quite similar and probably have similar feeding habits.

The Pacific triton is *Charonia tritonis* Linnaeus, 1758. The Atlantic shell is *Charonia variegata* Lamarck, 1816, which is considered by some to be a subspecies of the Pacific triton.

There are two principle differences in the shell. In the Atlantic shell, the columella plicae, or folds, are thin and strongly raised; in the Pacific shell, they are broad and slightly raised. Also the adult members of the Atlantic species have a raised, swollen angular shoulder on the last whorl.

Still another reader wrote: "Your article on the triton's trumpet prompted me to write about a shell I recently acquired, which is probably not a true trumpet. It is called an Australian trumpet and is in very good condition."

This reader is right in that the Australian trumpet he described is not a "true" trumpet shell. It is *Syrinx aruanus* Linne, 1758, a member of the family Galeodidae. It is collected from a depth of at

least 20 fathoms in Northern Australia from Bunbury, W.A. to southern Queensland. The northern shells have a high-shouldered spire and the shoulders are sometimes nodulose while at the southern end of the species range the shells have a low spire, straight sides with rounded shoulders. Externally and internally the shells are rich creamy-yellow but will, when alive, have a thick periostracum.

This shell will reach a length of at least 24 inches and is probably the world's largest gastropod shell. The reader stated the shell he collected was 24½ inches long. This may be a record size. The value of this shell is listed at between \$12 and \$24. A pure white, albino shell, lists at \$150.

The fourteen species of *Charonia*, their locality and their approximate value are as follows:

<i>C. australis</i> Perry (Australia)	\$1
<i>C. capax</i> Finlay (New Zealand)	\$1.50 to \$8
<i>C. eucilia</i> Hedley (Australia)	\$5
<i>C. gemmifera</i> Euthyme (South Africa)	\$3
<i>C. instructa</i> Iredale (Australia)	\$7
<i>C. lampis</i> (Mediterranean)	(no data)
<i>C. nodifera</i> Lamarck (West Africa)	\$4 to \$9
<i>C. powelli</i> Cotton (Australia)	\$3.50 to \$12
<i>C. rubicunda</i> Perry (Australia)	\$1.50 to \$7.50
<i>C. sauliae</i> Reeve (Japan and Taiwan)	\$1 to \$4.50
<i>C. semitarta</i> Iredale (Japan)	\$1
<i>C. subdistorta</i> Lamarck (Tasmania)	\$1.50
<i>C. tritonis</i> Linne (Indo-Pacific)	\$5 to \$50
<i>C. variegata</i> Lamarck (West Atlantic)	\$10 to \$30

Reportedly shells of *C. lampis* of the Mediterranean, *C. sauliae* of Japan, and *C. capax* of New Zealand are all alike and

need taxonomic work to ascertain if they are separate species.

The other comment I would like to make on some of the above letters is the use of common names when discussing shells. If you do want to use a common name when referring to shells, also use the scientific name in parenthesis although it is preferable to use the scientific name first then the common name in parenthesis. The use of the descriptive name "conch" is particularly confusing since there are so many conch shells. In addition to the genus *Strombus*, all of which are called conch shells, shells in the genus *Melogenia*, collected in the same area, are also called conch shells. *Melogenia melogenia* (Linne, 1758) is called the West Indian crown conch but is totally different from the West Indian fighting conch (*Strombus pugilis*).

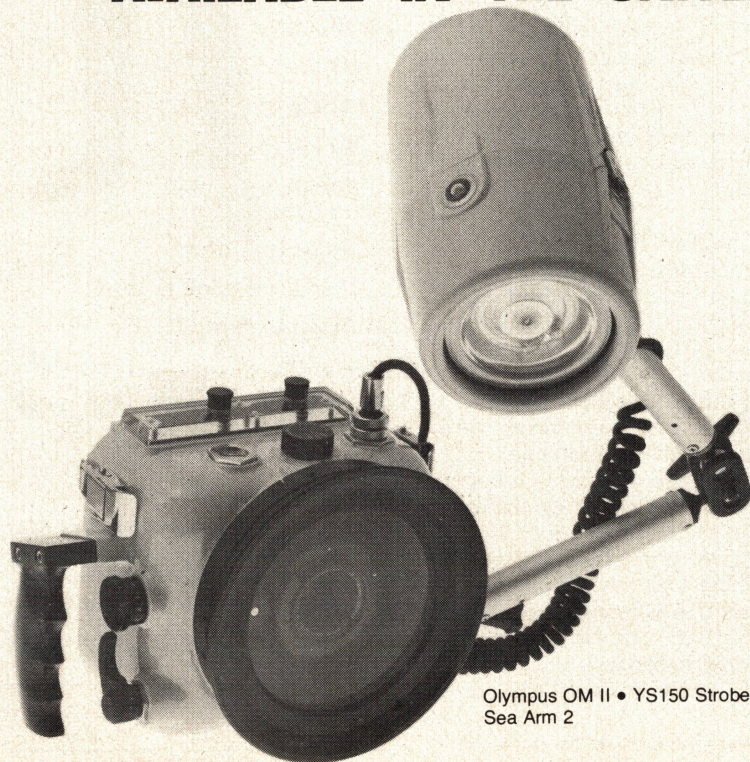
The common name "triton" is almost as bad. Shells in at least three genera are called "triton" shells. *Charonia* (14 kinds of tritons), *Syrinx* (the Australian triton, but also three Australian species of *Charonia* are called Australian tritons), and several species of the genus *Cymatium* are called tritons.

SHELL ID

"While on a reef in the Bahamas I found a shell." The reader, fortunately, added some additional information. "When you look inside, it looks like a baby's tooth. What's the name of that

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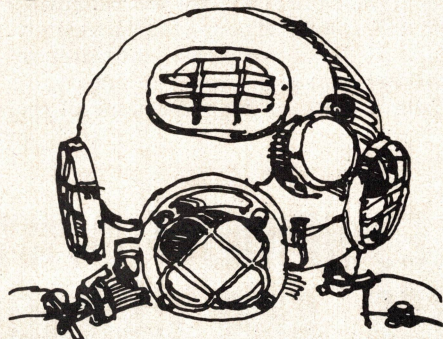
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SHELL NOTEBOOK

shell? How much is it worth?"

There are a number of shells that have teeth in the parietal area. One that is very pronounced and fits your description in that "it looks like a baby's tooth" and not "teeth" is *Nerita peloronta* Linne, 1758. This shell is found in southeast Florida, Bermuda, and throughout the West Indies. It is grayish-yellow in color with zigzag markings of black and red. It is particularly characterized by having a blood-red parietal area bearing, usually, one but sometimes two, teeth that are whitish in color. These teeth are much more pronounced than in other Neritidae species.

The shell is very abundant along the rocky shores facing the open ocean. Its value is minimal: 20 cents to 50 cents each, depending on size and condition. Sometimes called the bleeding tooth shell, it will reach a length of three-quarters to one and one-half inches.

CONUS LEGATUS

The value of *Conus legatus* (not ligatus) varies from \$7.50 to as much as \$18, again depending on size and condition. Also it makes a difference if the operculum is with the shell and the type of cleaning that may have been done.

This shell is one of the textile cone complex and is sometimes difficult to identify accurately. All shells in the group have the characteristic tent patterns of the textile cone and most are found throughout the Indo-Pacific including Guam. However, *C. legatus* is smaller than other mature tent marked cones being only 24mm to 30mm in length. It is also more slender than most others and has a tall pyramidal spire. Its base color is pinkish to flesh and has a fine network of light lines forming the tent patterns with occasional squarish blotches of dark reddish-brown color. The body whorl will be encircled with prominent ridges.

CHITON FOLLOW-UP

A reader from Mexico wrote, "I have always read your interesting column in my favorite magazine SKIN DIVER. In the March issue I read about chitons. . . here in Mazatlan . . . we have a rich abundance of shells. One kind of chiton is very abundant on the rocks facing the sea. It is harvested commercially for food and used in the restaurants where they make a delicacy called *cucarachas del mar*, that is, the cockroach dish from the sea, that is very nutritive and very expensive. These chitons are in great abundance and the fishermen cut them from the rocks with a knife and place them in hot water to separate the animal from the shell. After this they are prepared for food."

This reader added that he thought the

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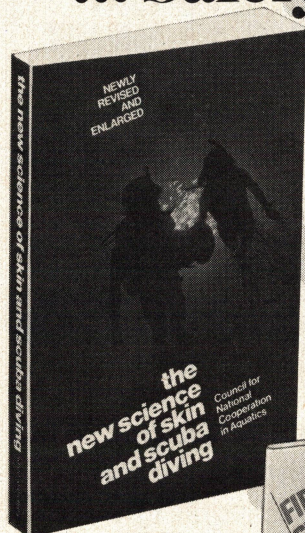
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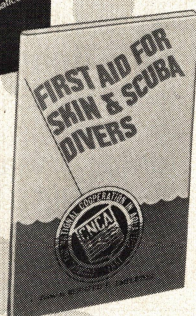
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above information was of importance in a hungry world so that mankind's diet could be made more rich and healthful.

I suspect this reader has chitons confused with a species of the family Patellidae. I have never heard of chitons being used for food although they probably would be edible. Most chitons are less than one inch long and have relatively small amounts that would be suitable for food. There are no references in my library of shell books to chitons having been used for food. On the other hand, one of the Patellidae, *Ancistromesus mexicanus* Broderip & Sowerby, 1829, the giant Mexican limpet, is the largest limpet in the world and is found in abundance in the Mazatlan area. However, there is danger of this species becoming extinct due to over harvesting.

I would appreciate hearing from readers about the use of chitons being used as food. I am sure they are but whether or not on a commercial scale I do not know.

CDI'S NEW COURSE

The Commercial Diving Institute of Whitestone, New York, has announced a new course, Introduction to Commercial Diving, which began this past August. The course, believed to be the only one of its type in the country, is designed to allow certified scuba divers, who do not necessarily want to become commercial divers, a chance to be exposed to and dive the different types of deep sea gear without having to take a full-length commercial diving course.



CDI director Larry Di Giacomo explained, however, that this course will not qualify anyone to work as a commercial diver or tender. In other words, this is a "fun" course in commercial diving. CDI's other courses are geared to produce working divers.

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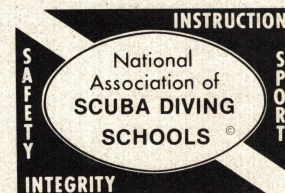
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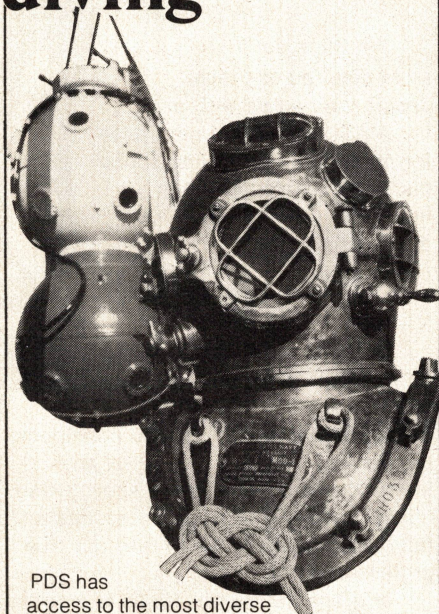
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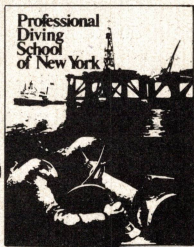
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STRYKOWSKI/TZIMOULIS IN ROCKFORD

Joe Strykowski, well known Midwest diver/author/instructor, will join Paul Tzimoulis, SKIN DIVER's Editor-Publisher, at the Rockford Divers Association's November symposium to be held at the South Beloit (Illinois) Holiday Inn.

Tzimoulis will host a film festival beginning at 7:30 pm on Friday, November 10th. Strykowski will present two additional films on Saturday afternoon, November 11th. Also on display will be antique bottles, wreck artifacts, seashells, photographs and dive equipment.

On Saturday evening a cocktail party, beginning at 6:30 pm, precedes the Ninth Annual Fall Awards Banquet of the Rockford Divers Association. Strykowski will MC this event.

Tickets for the symposium are \$3 for Friday night's film festival and \$12.50 for the banquet. For information, contact: Bill Steinborn, 1385 Randall Dr., Rockford, IL 61108.

IQ-10

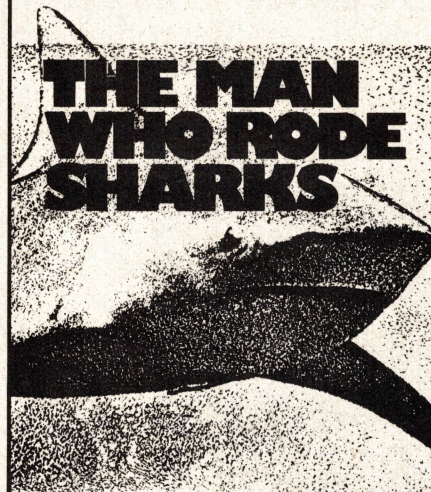
The Disneyland Hotel in Anaheim, California, will host the Tenth International Conference on Underwater Education on November 10-11-12, 1978. Sponsored by the NAUI Diving Association, IQ-10 is designed to bring together the public, divers, dive instructors and underwater experts from all over North America for three days of exciting activities.

Technical papers, social activities, equipment exhibits, film presentations and "hands on" demonstrations are designed to involve both the experts and the audience in this year's program.

One exciting feature of the program will be the *Dive the Americas* series portraying diving throughout the 50 states and North America. A featured speaker will be Ricardo Presbitero of the Mexican Government who will provide up-

To bring them up alive
he had to stay alive...

THE MAN WHO RODE SHARKS



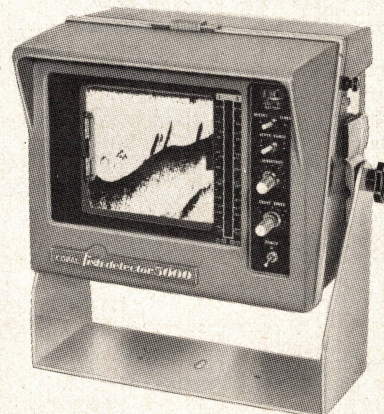
**William R. Royal
with Robert F. Burgess**

Now he recalls his fifty years of hair-raising diving adventures and astonishing underwater archaeological finds. \$8.95

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DODD MEAD

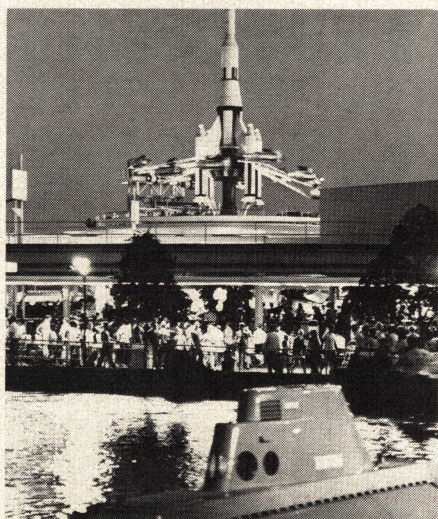
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Copal Fish Detectors locate the position, depth and size of schools of fish. They operate in shallow and medium depths from 10 ft. to 600 ft. They also detect ocean depth, topography, sea channels and submerged objects. Versatile flash indicator and chart recorder are accurate to within $\pm 4\%$. For more information write to: **Copal Corporation of America**, 58-25 Queens Blvd., Woodside, N.Y. 11377. L.A. Div.: 22010 S. Wilmington Ave., Carson, CA. 90745

COPAL FISH DETECTOR

Traditionally, IQ has provided a public forum for presentation of new and controversial sport diving theories, equipment and ideas. This year's gathering will be no exception as manufacturers present their wares and professional divers present new ideas.



© Walt Disney Productions

The culmination of the three day weekend will be Sunday morning's Jack McKenney Film Show featuring Jack's latest masterpiece, *The Underwater World of California*. On Sunday afternoon, Disneyland will brace for the invasion of conferees as the gates are thrown open to divers with all attractions for one low price (specially priced tickets available only through IQ).

For information, contact: IQ-10, P.O. Box 630, Colton, CA 92324.

OHIO COUNCIL PHOTO CONTEST

The Ohio Council of Skin and Scuba Divers will hold its national U/W photography contest again this year. Deadline for entries is December 21, 1978. Winners will be announced at the council's annual symposium and awards banquet to be held at the Salt Pork Lodge, Cambridge, Ohio, on Saturday, January 20, 1979.

Entry categories include saltwater and freshwater prints and slides and B/W prints. Four prints or slides in any category constitute an entry. More than one entry may be made, but each must be accompanied by an entry fee. Prints should be mounted on an 11 x 14 or 16 x 20 board. Do not send glass frames.

Entries must be postmarked no later than December 21 and must include \$4

(Continued on Page 34)

GLOBAL • HELLOPHONE • HYDRO PHOTO • IKELITE • IMPERIAL • INGERSOL • JEPPESEN • JOY

SUPREME



DIVERS

MANUFACTURERS OF MENT AND RELATED HIGH

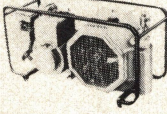
HYDROSTATIC EQUIP- PRESSURE AIR SYSTEMS

WE SHIP FOB OUR WAREHOUSES ON THE EAST AND WEST COAST OF THE UNITED STATES

990 Portable Lightweight Compressor

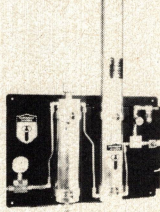
For smaller groups of divers — weighs only 32kg — fits the trunk of any car — fills 80 cu. ft. tanks to 3150 psi in 22 minutes — equipped with gasoline electric motor.

Complete with cart-ridge filter
\$1800 (shipping \$50).
 Larger Poseidon models available.



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Supreme Pure Air Systems are manufactured to ASME (4-1) pressure standards for up to 100 SCFM pure, dry air. Systems are available with or without CO removal, complete with all necessary gauges and fittings for fast, easy installation; featuring low-cost cartridges for replacing filtration chemicals. Exceeds all current standards for compressed breathing air purity (OSHA, CGA, CSA).
 Shown model S-11: processes 24,000 cu. ft. of air, with CO removal \$995 (shipping \$25). Replacement cartridge \$39.95.



High Pressure Compressors;

Ingersol-Rand model 6R51, 50CFM, 5000 psi; head complete (no motor or filters); unused government surplus; one year guarantee; \$6000.

Hydrostatic Testing Equipment:

We custom manufacture hydrostatic cylinder testing equipment for recertification of all cylinders from scuba tanks to giant trailer tubes forty feet long.

Write for a free copy of our Commercial Catalogue.

Tanks

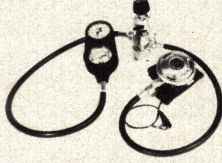
Name Brand Galv. 71.2 cu. ft. Steel Tank W/J Valve, U.S. Divers Mariner Pac & Boot; \$149.95 (shipping \$6).
 U.S. Divers 80 cu. ft. Professional Aluminum Tank W/J Valve, U.S.D. Mariner Pac & Boot; \$194.95 (shipping \$6).
 Pony Bottles; now improved. 1/2" O-ring neck and valve. . . harness. . . high resistance finish: :
 12 cu. ft. 4" dia. x 22" . . . \$74.95
 20 cu. ft. 4" dia. x 27" . . . \$84.95





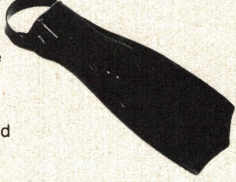
Oceanic Dive Light

This popular hand-held rechargeable light provides 1 1/2 hours of burn time on a single charge from 110 volt a/c, or from your 12 volt d/c car cigarette lighter; \$69.95 (shipping \$3).



Dacor Polar 400 Regulator W/ Oceanic Combo Gauge

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 Reg. & Combo \$260.
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Unbelievably low-priced 1/4 in. nylon lined super suit. . . all stitched seams. . . one zipper. . . custom contoured. . . one year guarantee. . . in men's stock sizes only: XS, S, M, L, XL (if unsure of size, send height, weight, waist and hip measurements); \$99.95 (shipping \$7).

Send \$1.50 for a copy of Canada's largest and most informative sport diving catalogue (142 pages), refundable with first purchase.



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World famous decompression meter from S.O.S. is the only hand-held mechanical De-Com meter that has proved itself reliable over the years; \$99.95 (shipping \$3).



Puma Mask

Modern, light weight, low volume mask. Fast, easy strap adjustment allows positive locking, easy adjustment, and smooth cosmetic appearance. \$27.95 (shipping \$2).

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Life support equipment cannot be advertised for mail orders. Enquire at our stores for point-of-purchase sale details.

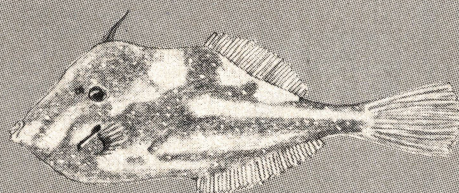
• MAKO • NEMROD • NIKONOS • OCEANIC • ORIENT • PARKWAY • POSEIDON • RAND • REAVELL • RICOHO • RIX • ROLEX • ROLLEI • SEA SUITS • SYAMSUIT • TYPHOON • SUBSEA •

• WORTHINGTON • U.S. DIVERS • UNISUITS • TABATA • TEKNA • TIGULLIO •

The Orange Filefish

(*Alutera schoepfi*)

Plectognaths are an order of fishes with odd characteristics: hard skins (triggerfishes and filefishes), "box" skins (trunkfishes), and "naked teeth" (puffers and porcupinefishes). Almost all of them are considered poisonous to humans, or at least capable of causing a nerve poisoning called ciguatera. The hard skinned triggerfishes and filefishes are considered one family, Balistidae, by some ichthyologists, but others separate these two into Balistidae (triggerfishes) and Monacanthidae (filefishes), with the latter including the Aluteridae. The family separation between triggerfishes and filefishes is based on the fact that while both fishes have the single, long dorsal spine, the triggerfishes have an important secondary spine which moves forward to lock the first into place, like a trigger. The fish uses this device of nature for defense. The filefishes have no such mechanism. Another differentiation is that filefishes have more compressed bodies, with scales that are not as pronounced as those of the triggerfishes. In fact, the scales of filefishes have small spinules — minute spines — which give the fish a rough, leathery feel. Sailors of the past very often dried the skins of filefishes and hung them by their galley stoves, using them to strike their matches on. In Latin, *alut* means leather, and is an appropriate root word for the fish with the rough skin. □ *Alutera schoepfi* is commonly called the orange filefish because of its numerous small, round orange or orange-yellow spots. The coloration of this fish is highly variable, since it can change like a chameleon to match its surroundings. The ground color of the fish can be pale or dark gray to brown, with pale, light orange areas. But sometimes the entire body can be dark. The orange



spots are not so distinct on our pictured specimen, the overall effect being somewhat mottled. The specific name *schoepfi* is for Dr. Johann David Schopf, a surgeon of the American Revolution who was also a botanist and observer of wildlife.

□ There are two principal species of aluterids in the Caribbean, *A. schoepfi* and *A. scripta* (the scrawled filefish). There is another, *A. monoceros*, the unicorn filefish, but this species is rare. Aluterids are distinguished from the other monacanthids by having a narrower profile, the ventral area not being quite so deep or distended. Aluterids exhibit

bizarre behavior, swimming slowly near the bottom or reef, shy and always ready to hide, which they do by aligning themselves tail up/head down next to corals and plants, swaying back and forth in the currents, changing colors frantically in an effort to disappear. A diver can actually watch all of this activity at

close range. The fish, in turn, while swaying with corals and plants and changing colors, will roll its eyes independently of one another — keeping one on the diver and the other on the seascape for a possible escape. □ The orange filefish grows to a hefty 20 to 24 inches but is not a strong swimmer. It pokes around the bottom with its small mouth, picking off seagrasses and algae to eat. According to John Randall, it also eats crabs and gastropods, but the diet is mainly vegetarian. Ichthyologists Bohlke and Chaplin report the orange filefish from Nova Scotia and Bermuda to Brazil, including the Gulf of Mexico. It is found in relatively shallow water but is not limited to such depths. In the Gulf of Mexico, adults of these fishes have been taken from 6 to 48 fathoms in shrimp trawls. The young are often found at the surface, in floating sargassum weed. »

Photo By Carl Roessler - Text By Hillary Houser

The photo was taken in 25 feet of water in the wreck of the *Balboa*, Grand Cayman Island. Roessler used a motorized Nikon F, 55mm lens, in a Nikomar housing. Shot at f16, 1/60 second, 18 inches from subject.



The shortest distance between two points underwater.



You're down 55 feet and 350 feet from the support boat. It's time to get back. Time to find the boat. But you stay down to avoid a rough surface swim. You know a Wet Beacon marker is secured to the anchor line. It's sending out an ultrasonic pulse. And you scan for the pulse with your Wet Finder, the hand-held, light-weight receiver. Within seconds the Wet Finder LED signal hones in on the marker, fixing your direction. When you surface, you're 4 feet from the bow. Perfect. You're glad you weren't depending on a compass.

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FESTIVALS 'N SYMPOSIUMS

(Continued from Page 31)

for each entry along with funds to cover return postage and postal insurance.

Send entries to: The Ohio Council National Photography Contest, P.O. Box 572, Delaware, Ohio 43015.

LOS ANGELES UPS FILM FESTIVAL

The Los Angeles chapter of the Underwater Photographic Society will hold its 16th Annual Underwater Film Festival on November 4, 1978, at the Bovard Auditorium, on the University of Southern California campus.

Winners of the annual UPS film competition will be announced.

For information, contact UPS, Box 7088, Van Nuys, CA 91409.

OUR WORLD U/W SCHOLARSHIP

The Our World-Underwater scholarship is awarded annually to an outstanding individual (or individuals) between 18 and 25 years of age planning to make a career in one of the water-related disciplines. The purpose of this scholarship is to further the education of the individual by practical exposure to various fields of underwater endeavors and to the leaders in those fields.

The exposure consists of active participation in field studies, expeditions, research trips, laboratory assignments, underwater equipment testing, photography and other specialties.

The maximum amount of any one scholarship is \$5,000. However, in addition to the primary scholarship, secondary scholarships and mini-experiences may be awarded to outstanding finalists.

The awarding of the scholarship will be done by the Our World-Underwater scholarship committee on the basis of the applications submitted. Additional information may also be requested from the applicant. Scholarships will be awarded at the annual Our World-Underwater program held each May.

Preliminary applications are available from: Our World-Underwater, Box 4428, Chicago, IL 60680. Applications must be submitted by January 1st.

NEW ORLEANS HOSTS DEMA '79

The exciting city of New Orleans will host the 1979 DEMA Trade Show and Convention to be held January 20-23. This year's show will be the largest ever, with the majority of exhibit space (33,000 square feet) already sold, by press time.

DEMA (Diving Equipment Manufacturer's Association) has a packed agen-

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Offers more enjoyable diving for eyeglass wearers. We permanently bond ground lenses to your own face mask with an optically clear modified epoxy specially tested to withstand temperature and pressure extremes. The 71 mm blanks we begin with are custom-contoured to each mask on the market before grinding to give excellent vision from both lateral and horizontal edges of mask. Guaranteed to give you the same vision under water as you get on land with your eyeglasses. (Actually better, since all objects are brought closer). These uniquely bonded lenses can be yours for only \$39.50. Bifocals add \$14. Uncond. guar. Returned by insured Parcel Post. Add \$2.00 for Postage. Include Postage if order is outside continental U.S. Illustrated literature available on request. Send your prescription, distance between eyes, vertex distance and face plate only to:

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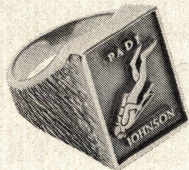
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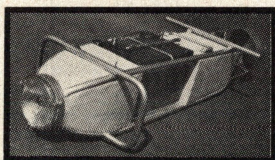
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Wet Suit
Textured, 1 zipper
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EVERYTHING FOR THE DIVER

da of activities that includes seminars, clinics and evening films. Dealers will be able to preview every major line of dive equipment, since all major manufacturers will be there. Also exhibited will be related products such as boats, photo equipment, clothing, and a huge assortment of dive accessories. Dive tour agencies, publications, and instructional organizations will also be represented.

Breakfasts, cocktail parties and other social get-togethers are planned, so that the dive retailer can get acquainted with the manufacturer. At the Saturday evening cocktail party will be one of diving's most comic filmmakers, Dick Anderson, who will show his two classics, *Mac the Dog*, and *Gold from the Winfield Scott*.

Adding to the excitement is New Orleans — one of the Deep South's most famed cities. The host hotel for the DEMA event is the Grand Hotel, located on historic Canal Street and only a quick walk from the French Quarter with its fabulous Bourbon Street! Dealers can mix dive business with tours of old Creole homes and iron lace balconies, Dixieland jazz, terrific restaurants and exciting night life.

The fee for dive equipment dealers, retail sporting goods dealers and their guests is \$10 per person. O.E.M. accounts, vendors to manufacturers, sales reps looking for lines, etc., will register as guests of DEMA for a fee of \$25 per person.

Once you have registered, with fees sent to DEMA, you'll receive your badges, drink tickets, and the agenda of planned activities. In addition, independent travel agencies will send you information about tours in New Orleans, as well as descriptions of dive tours after the show. You'll also receive hotel information so that you can make arrangements for your rooms directly with the Grand Hotel.

For information and registration forms, contact: DEMA, P.O. Box 4067, Irvine, Calif. 92716. (This show is not open to the public.)

KNIFFIN WINS CDC SCHOLARSHIP

Diver Richard Kniffin has won a \$2,039 scholarship to attend the Commercial Diving Center in Wilmington, Calif. CDC's Lardner Scholarship is presented each year at the International Conference on Underwater Education.



Kniffin received his award at last year's IQ-9 and will attend CDC this fall.

GLENN BEALL'S Monthly Special

ONE-HAND DIVING REEL

15HC2-100

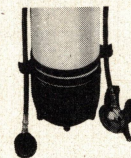


Leaves one hand free for tending students, cameras or other tools. Durable one-piece plastic in bright Dayglow Red. Non-kinking 400 lb. test braided Nylon line. Nickel and cadmium plated hardware. Reel without line \$4.20. Reel with 100 ft. line & snap \$10.95.

Other Glenn Beall Diving 'Musts'

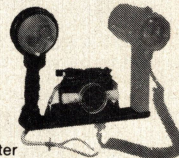
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Increases your pleasure, safety and time under water. Keeps you organized. No more frustrating groping for your underwater pressure gauge or octopus regulator. No more dangling gauges getting caught on coral or in shipwrecks. Don't panic. Get a Hose Holder. \$3. Plus \$7.00 ship & handl.

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A complete system for mounting Light Meter, Camera, Underwater Light. Lets you get it and keep it all together, topside and underwater. The ultimate in convenience and one-hand operation. Fits Nikonos II & III. Complete Mounting System & Shutter Trigger—#27HC8—\$49.50, plus \$1.50 ship and handl.

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Threaded adapter and hinged cover eliminate the old problem of losing friction fit lens covers. The threaded adapter screws into any lens with a 58 mm thread (Nikonos 28 mm and 35mm lenses). \$6.95, plus 50 cents ship & handl.

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Guard against loss of expensive equipment. Looped Nylon line has nickel plated or bronze quick release thumb lever—and Dayglo Red plastic slide for tightening the loop. #33HC2 with nickel release \$3. #33HC2B with bronze release \$3.85, plus \$.85 ship & handl.



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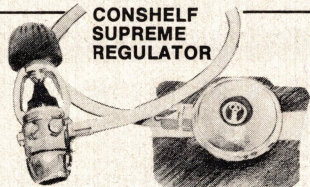
Designed for Sekonic Marine Meter II. Securely locked into Mounting Bracket with 2 threaded rings, can be removed without tools. Bracket has threaded fittings on back and bottom, allowing it to be mounted on top or side of a camera housing. Bracket can be removed easily from Handle for mounting on a camera or Nikonos handle. Complete Unit—Mounting Bracket, Handle & Eye Bolt #41HC2—\$19.95. Plus 75 cents shipping & handling. Mounting Bracket Only #41HC32 \$12.95. Plus \$1.00 shipping & handling.

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SUPREME
REGULATOR**

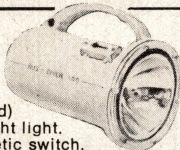
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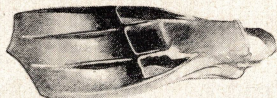
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Rugged metal housing—good to 400 ft. Ten flashlight batteries (not included) provide blinding-bright light. Failsafe magnetic switch.



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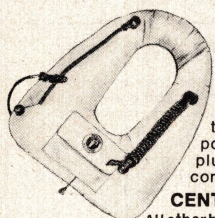
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Double-bag construction, lifetime guarantee, and all the features you want. Front pocket, oral and CO₂ inflators plus low pressure scuba connector included.

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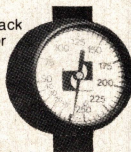
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LOOE KEY SANCTUARY

In August, the Marine Wilderness Society initiated a state-wide petition drive to obtain federal marine sanctuary designation for Looe Key Reef, in the Middle Florida Keys.

"We believe this action is necessary in light of the July 17 decision by the Office of Ocean Management to delay further progress on the designation for 12 to 18 months," commented Alexander Stone, public information officer for the Marine Wilderness Society. "In our view, this delay to await the results of a fisheries management study ignores and does not address the provisions of the Marine Sanctuaries Act that call for the establishment without delay of marine sanctuaries in areas whose high recreational, esthetic, or unique value is endangered.

"We are convinced that Looe Key Reef needs protection now if its unique coral formations and diverse marine life are to be preserved from irreversible damage . . ." Stone concluded.

For information write: Marine Wilderness Society, P.O. Box 943, Miami, Florida 33165.

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Frank W. Dunham, former head of the U.S. Navy's submarine structures division, has joined Kittredge Industries, Inc., as a director.

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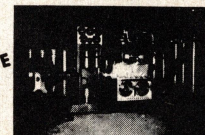
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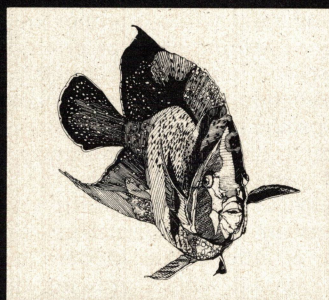
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NEW NAUI LOGOS

During NAUI's March 1978 Board of Directors meeting, newly designed logos for NAUI Canada and NAUI U.S. were formally voted on and accepted.



NAUI Canada took the lead on the project by forming a committee to design a logo for the Canadian Underwater Conference. The committee assigned the project to John Orr, a NAUI diver, who is also a professional graphic artist in Toronto.



Orr's design met the criteria of clean, modern graphics, easily reproducible in many printing modes, and most importantly, is international in application.

Two other logos have also been approved for future use: the NAUI Japan logo, with a brilliant red sun in the letter "A," and the NAUI International logo with a globe in the letter "A."

Both NAUI Canada and NAUI U.S. have T-shirts, emblems and other specialty attire featuring the new logos. For order information contact: NAUI Headquarters, P.O. Box 630, Colton, CA 92324, or NAUI Canada, P.O. Box 510, Etobicoke, Ontario, Canada.



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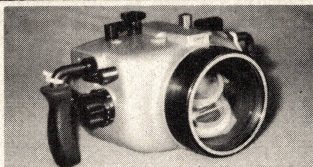
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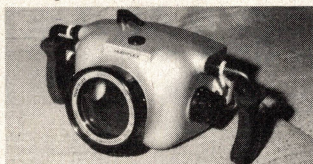
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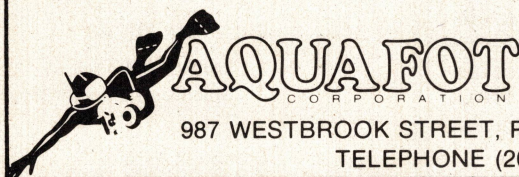
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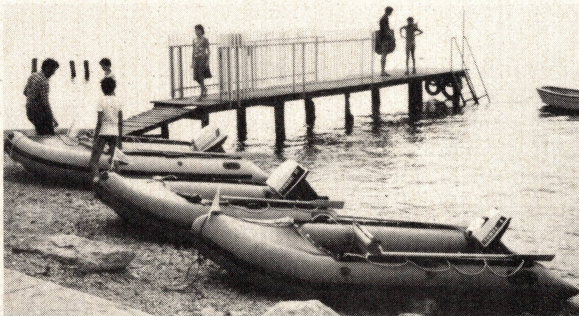
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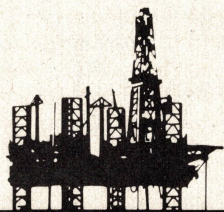
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EDITORIAL

(Continued from Page 4)

tion. In preparation for building, most of the topsoil and plant life is ripped away, much like strip mining. Subsequent rains wash tons of sand and silt into nearby rivers and ocean front areas. A giant undersea sand storm occurs as billowing clouds of debris are carried by currents and tidal flows. Miles of healthy coral reefs and delicate estuarine ecosystems can be quickly killed by these enveloping clouds of silt and sand which smother life. Temporary retaining walls or ground cover are seldom employed because of high construction costs and lack of laws. The end product of land developing is often a scenic shoreline community and a total wasteland underwater.

COMMERCIAL FISHERIES — Our oceans are being overfished — of this there is little doubt. Modern technology coupled with a growing demand for protein has placed an unbearable burden upon the fish population of our seas. The Japanese and Russians have begun heavy fishing along the outer edge of our continental shelf because they have depleted the fish populations in their own backyards. There are hundreds of commercial fisheries with fleets which go out daily and haul in tons of fish. Just one of these fleets can haul in more fish than all of the spearfishermen in the world since the history of time began. Unless we soon abandon our archaic concept of hunting fish, they will all be gone. We must replace old methods with new concepts in fish ranching and mariculture.

We have mentioned only a few of the destructive forces killing our oceans. There are many more outstanding examples of disregard for marine ecology and deliberate pollution perversion, such as: bilge dumping at sea by oil tankers; atomic and hydrogen bomb tests on Pacific atolls; and coastal construction of nuclear power plants.

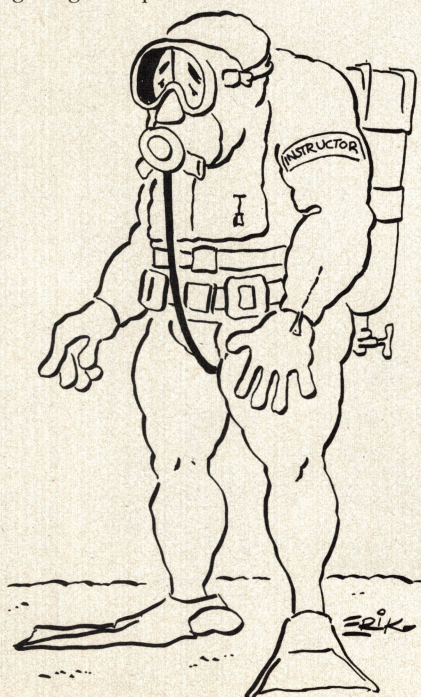
Why are these killers of our seas permitted to continue their destruction? Part of the answer is mankind's basic stupidity about the environment in which he lives. Here in the U.S., we have inherited a legacy of 200 years of early ignorance and poor planning. The founders of Boston, New York, and Philadelphia never dreamed of such large populations nor had any concept of the pollution impact these cities would make. It has only been in the last decade that the American public has become aware of the full meaning of pollution. Unwittingly, we have built gigantic pollution bombs and now find it virtually impossible to stop or control these monsters.

It is easy to blame the government for our miseries but incredibly difficult to affect any change. The price of reform

and reconstruction will be staggering. Sewage treatment plants are not cheap and reclamation of industrial wastes will be equally costly. If we do everything necessary to correct or stop present pollution, it will cost billions of dollars. The price of goods and services will increase considerably to offset these costs. We will have to pay a heavy price for the pollution sins of our forefathers.

At present, government is unsure and therefore ineffective in the area of pollution control. EPA has helped to slow the rate of future pollution but has proved ineffective in correcting old problems. Government is not sure that the public is willing to pay the high cost for environmental improvement. In many areas, government is still strongly influenced by big business, labor unions and taxpayer lobbies. Nobody wants to spend the money necessary for improved pollution control. Public outrage and demand is the only way to clean up this mess.

What can you do to make things better? First of all, educate yourself. Put spearfishing into proper perspective, for it is as much a part of diving as underwater photography. Yes, we need better conservation controls and more underwater parks, but don't pick on the little guy just because he is more vulnerable or more visible. If you are genuinely concerned about conservation, find out who is really killing our oceans. And once you understand the overall picture of what's happening in our seas, find a way to expose these polluters to the public. This issue of SKIN DIVER carries a very important message from Captain Jacques Cousteau. Read it carefully and use it as a basic guide for your future actions. Subsequent issues of SKIN DIVER will carry stories and articles on how divers are waging war, and winning, in the fight against pollution.



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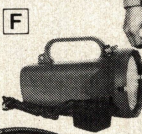
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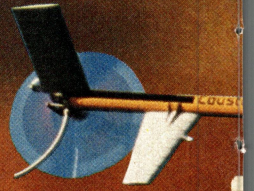
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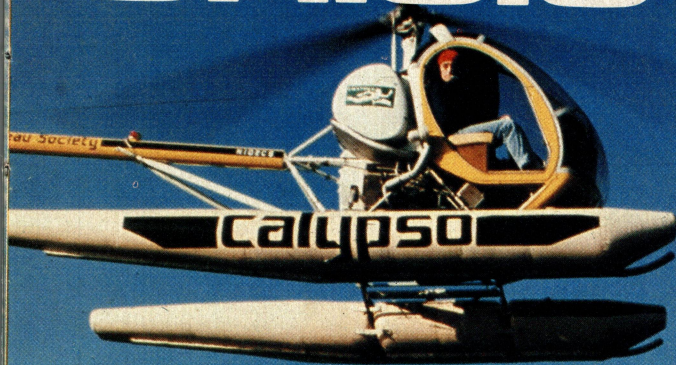
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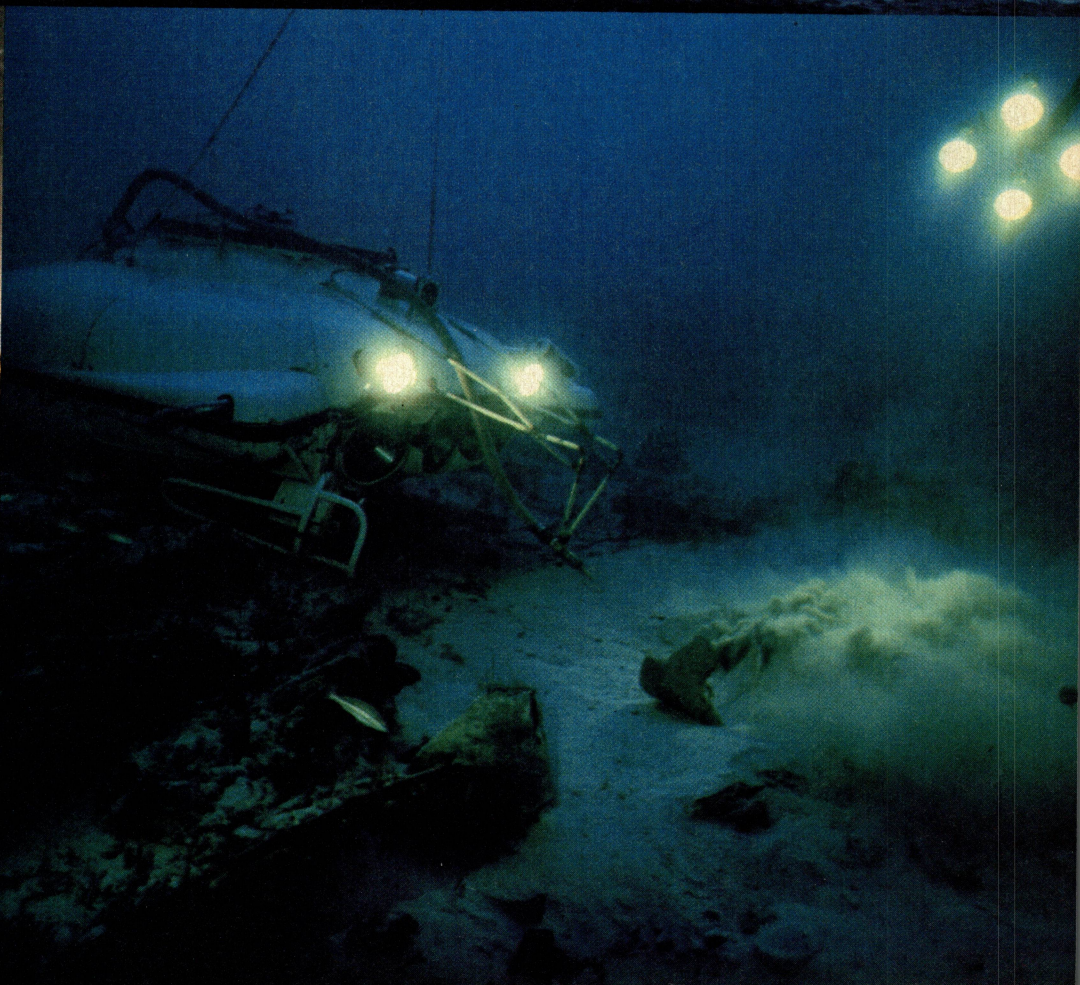
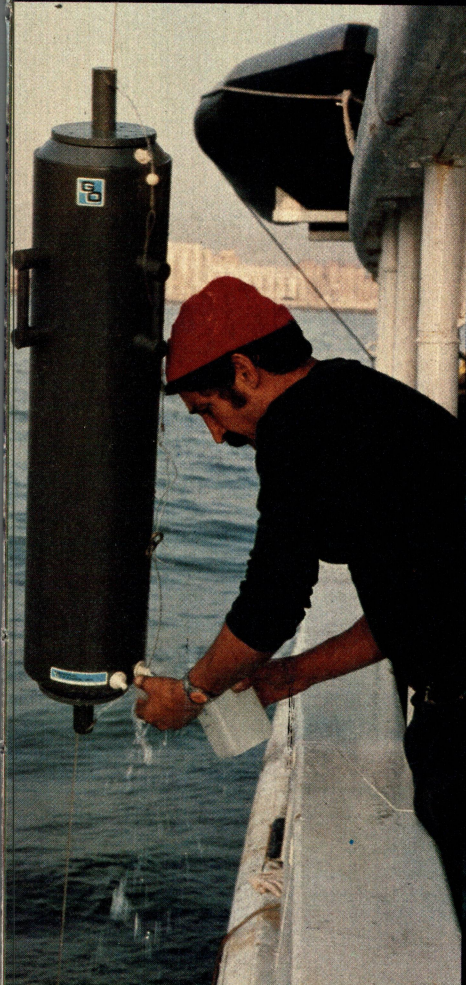
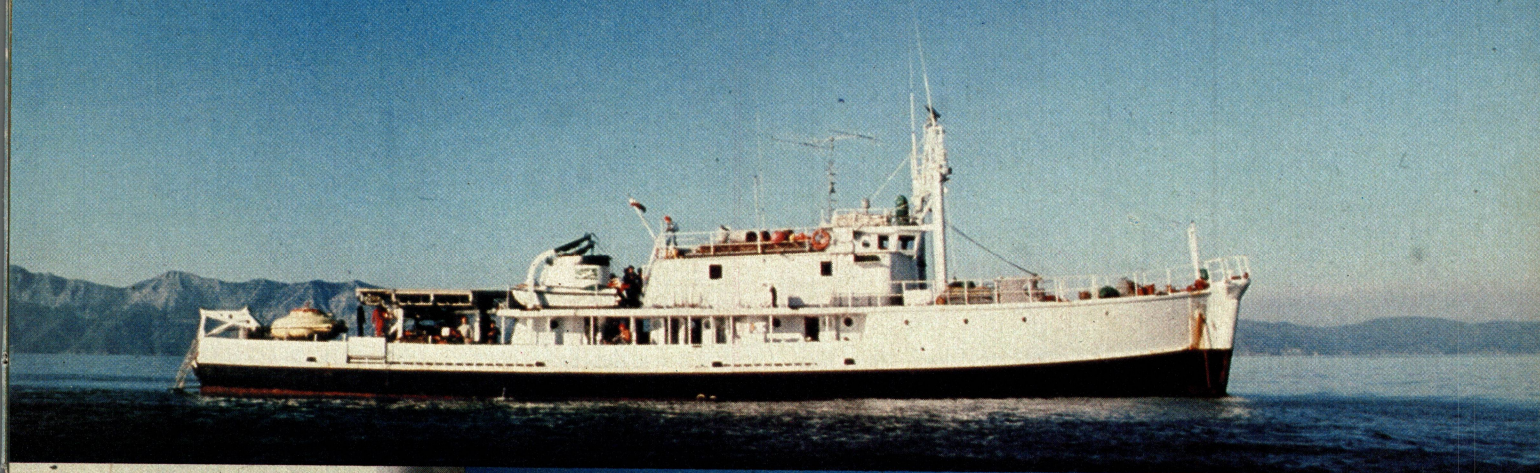
*"We divers are witnessing
the demise of the previous
wilderness we discovered."*

CRISIS

A SPECIAL REPORT BY
JACQUES-YVES COUSTEAU



It has been almost four years now since SKIN DIVER Magazine published an interview with me at the inception of The Cousteau Society. I expressed in that article my alarm at the cancerous



growth of destruction in the sea and my worries that an uninformed public would not act in time to protect fragile marine systems. I wanted to communicate immediately with the dive community about our formation of a non-profit organization devoted to protection of the water planet, because over the years, we divers have been a close family. Together we have discovered a new world, experiencing scenes and observing wildlife unknown to our fellow humans. We are a fraternity of explorers.

For this reason, and because The Cousteau Society has been strengthened enormously by the support of divers, I would like to pass along a second communication to our diving friends. A great deal has transpired in four years and it is time for an update on the work of The Cousteau Society and the environmental situation as we perceive it.

It is our feeling that divers are the first witnesses to the deterioration of the marine habitat. We are like sensors on the fingertips of humanity. Our crew recently completed a five-month study of the Mediterranean Sea, making hundreds of dives. During this underwater work, we were providing data for a United Nations study of permanent pollution in this closed sea, which is an approximate microcosm of the world ocean. But of equal importance — and greater excitement to our crew — we were asked to investigate 16 sites being considered as possible marine parks.

This was an enviable assignment, as you may imagine. Our divers looked forward to a kind of working vacation exploring rich habitats along sunny Mediterranean coasts. These are the waters which attracted all of us to diving, where the *Calypso* and her crews first explored, where I taught my two sons to dive, where the groupers and octopuses and schools of mullet thrilled us, and fostered in us a deep love for the undersea world.

Consider then, as fellow divers, our sorrow and our outrage at what we encountered in dive after dive.

Of the 16 underwater areas proposed for marine parks because of their rare diversity and beauty (and of course importance!), *all but five* were so badly ravaged by human abuse that they were beyond protection. Ironically, the first major survey of potential Mediterranean sanctuaries has found that in most cases we may be acting too late! Once-thriving communities are already empty wastelands.

Healthy systems have collapsed under an enormous assault from commercial overfishing, careless shoreline development, industrial waste, municipal sewage and agricultural chemicals. In general, these massive, institutionalized

"Divers are the natural crusaders"

sources of devastation are the greatest threat to marine vitality. As far as pollution is concerned, 85 percent of the toxic products in the Mediterranean comes from land-based sources — the factories, sewage systems and farms. Washed by the rain or directly dumped into the rivers come the deadliest killers: mercury, cadmium, pesticides, defoliants, and PCB's. Industry is also a culprit in the careless dispersal of crude oil into the sea.

The effects of commercial overfishing are seen even in potential marine parks, which are considered relatively untouched regions. As the size of fish and crustaceans diminishes, fishermen are using smaller mesh nets, catching small alevins as well. Worst of all, some undersea habitats have been annihilated by dynamite fishing, surely one of humanity's most insensitive methods of pursuing profit.

The Cousteau Society has accumulated data on these catastrophes and an 18 country Mediterranean Plan of Action is underway. We believe our programs of scientific analysis and international communication are the most effective ways to counter the insane use of the sea as a garbage disposal and the equally insane practice of wiping it clean of life. To mobilize popular support, we make the results of our analysis known to all, thanks to our access to mass media. Those divers who belong to The Cousteau Society are supporting a crusade against these large-scale abuses of the sea. We are presently engaged in a Nile expedition (studying the destructive effects of the Aswan Dam and of other water management projects on the river's contribution of fresh water to the fertilization of land and to the Mediterranean as well) and we are preparing an ecological survey of the Red Sea and Persian Gulf to contribute to the United Nations Environment Programme.

Our inspiration is not exclusively scientific or "environmental," however. The essential marine systems necessary to all life are under siege — but there are more personal losses, too. The joy of *diving* is diminishing. The experiences I so passionately introduced to my children may not be available to my grandchildren. The seemingly endless wildlife scenes portrayed in *Silent World* are disappearing everywhere. We divers are witnessing the demise of the precious wilderness we discovered.

It has never been more important for us to

band together as defenders of the world we know more intimately and more fully than most humans. The Cousteau Society is now creating a massive drive to involve the dive community with our work, and to inject into dive courses a solid education in marine awareness.

It is important, as we begin this new program, to state clearly what our main objectives are:

The European community is still dumping nuclear waste in the Atlantic. We must obtain an international ban on such practices.

Worldwide, marshes, lagoons, and beautiful shores are sacrificed in favor of indiscriminate coastal development. We must lobby to implement protection over large sections of the littoral zone still untouched.

Commercial fishing must be regulated internationally. The 200 mile economic zones must be turned into "zones of responsibility" over which the ruling nation should enforce international protective rules.

Marine sciences must be generously funded to determine what quantities of biodegradable poisons can be tolerated by the ocean and how they should be dispersed, while a total ban must be designed concerning permanent, nondegradable toxic products.

To avoid such disastrous oil spills as that of the *Amoco Cadiz*, a stringent set of rules governing maritime traffic must be implemented, along the successful lines of modern air traffic control; tankers must have two engines, two propellers, two steering systems, double hull, a maximum tonnage of 100,000 tons; flags of convenience must be outlawed.

Marine mammals must be saved from extinction; a ten year moratorium on whaling must be implemented. Purse seine tuna fishing must be modified to avoid slaughtering dolphins.

The public at large must be educated about these matters in order to obtain the support of a vast constituency. And for this, mass media must be supplemented by an active campaign of word-of-mouth information, for which divers could become the essential popular educators.

In Italy, yielding to popular pressure, the government has provided \$12 million to finance the most extensive and difficult salvage operation ever: The Yugoslav freighter *Caotat* was rammed by a Panamanian ship and sank in 1976 with a cargo of 900 drums of lethal lead tetraethyl and lead tetramethyl. All but seven drums were salvaged, after 14 months of dangerous saturation diving in 300 feet of water. We filmed the entire operation. Thanks to modern dive techniques, an unprecedented ecological disaster was avoided. We must use this unique precedent to oblige authorities to salvage all dangerous cargos from accidentally sunken ships.

"All of us who have actually been in the sea and witnessed its value, must unite to save it for our children"

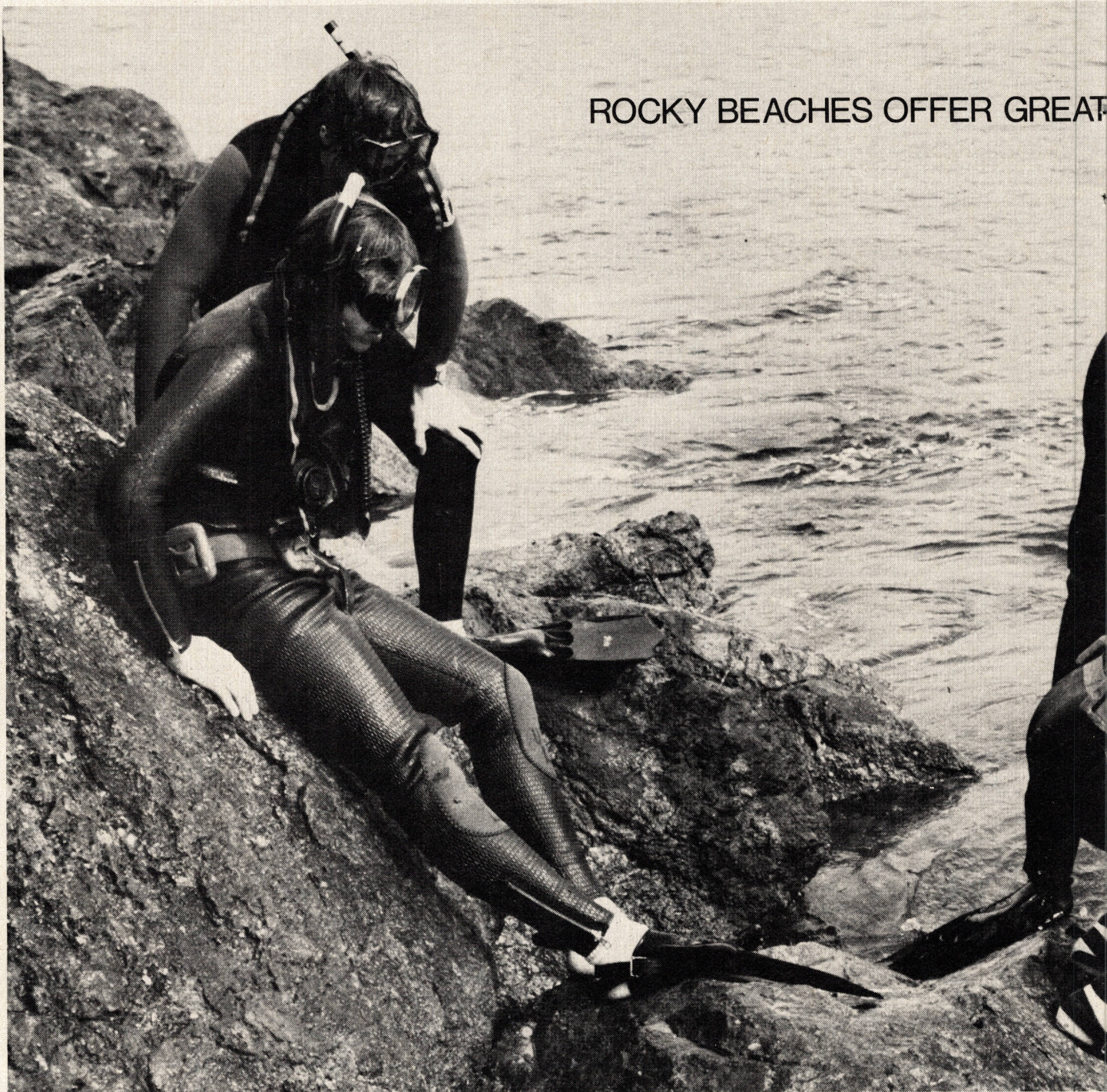
The dive community should be actively operational in spotting all threats to the sea that they can discover, and reporting them to The Cousteau Society.

Now for minor considerations: I hope someday we can dismiss the term sport in reference to diving. The image that comes to mind is one of competition. But what is the rivalry? We should not regard ourselves as competitors against nature, but rather explorers, documentarians, travelers, spectators. The Aqua-Lung® is a simple tool, making possible the passage of humans into another world. Entering the undersea environment is not sport in the competitive sense anymore than backpacking in the countryside. The phenomenon of diving is a tremendous source of pleasure, but the enjoyment does not come from any conquests; it is the thrill of adventure, of unearthly scenes, of joyful sensations, of rare animal sightings, of discovery, of beauty. We must retain a sense of proportion about the various menaces to the marine habitat and threats to the future of life on our planet.

It is destruction resulting from decisions that hold economics more important than the quality of human and animal life which most anger The Cousteau Society. Our crusade begins there, and divers are the natural crusaders. Acting as such, their sense of responsibility will grow. As population expands and the dive community increases, needless destruction and waste must be prevented wherever they occur in our disappearing underwater wilderness.

We do oppose such unnecessary abuses as spearfishing tournaments, which annihilate fish randomly throughout a region. And for what? For egotistical, temporary satisfaction. Piling up tons of fish to win a trophy does not comply with the acceptable concept of catching a fish for one's meal. During our recent investigations of the vitality of the Mediterranean, we documented the dismal legacy of these sporting events. Tremiti Island, off the eastern coast of Italy in the Adriatic, was once an oasis for European divers. Lying 25 kilometers from the shore in clear, shallow waters, it was surrounded by a rich undersea population of fishes. The diverse and exotic habitat suggested to someone that Tremiti should be the site of an annual spearfishing tournament. The result, as recorded by our cameras, is a desolate undersea environment virtually ex-

(Continued on Page 68)



ROCKY BEACHES OFFER GREAT

BY MARY A. WRIGHT

Risking life, limb and an unscarred wetsuit in order to make an entry and return over rocks encrusted with barnacles and mussels is not everyone's idea of fun diving. However, the diver who has mastered a few basic rocky beach skills has opened up an exciting new world underwater.

Rocky areas are generally less frequently dived, abound in diverse marine life and provide a three dimensional contrast to the starkness found in many sandy beach environments.

Visibility is often better here since less sand is stirred up by the surf. Also, because of the dampening effect of the uneven bottom on the incoming swell, the surf is often smaller here than on flat sandy beaches.

A rocky beach dive can provide many of the positive aspects of a boat dive without the same investment of money or time. Rocky areas may be especially appealing for novice snorkelers and skin divers. They can select the water depth most comfortable for

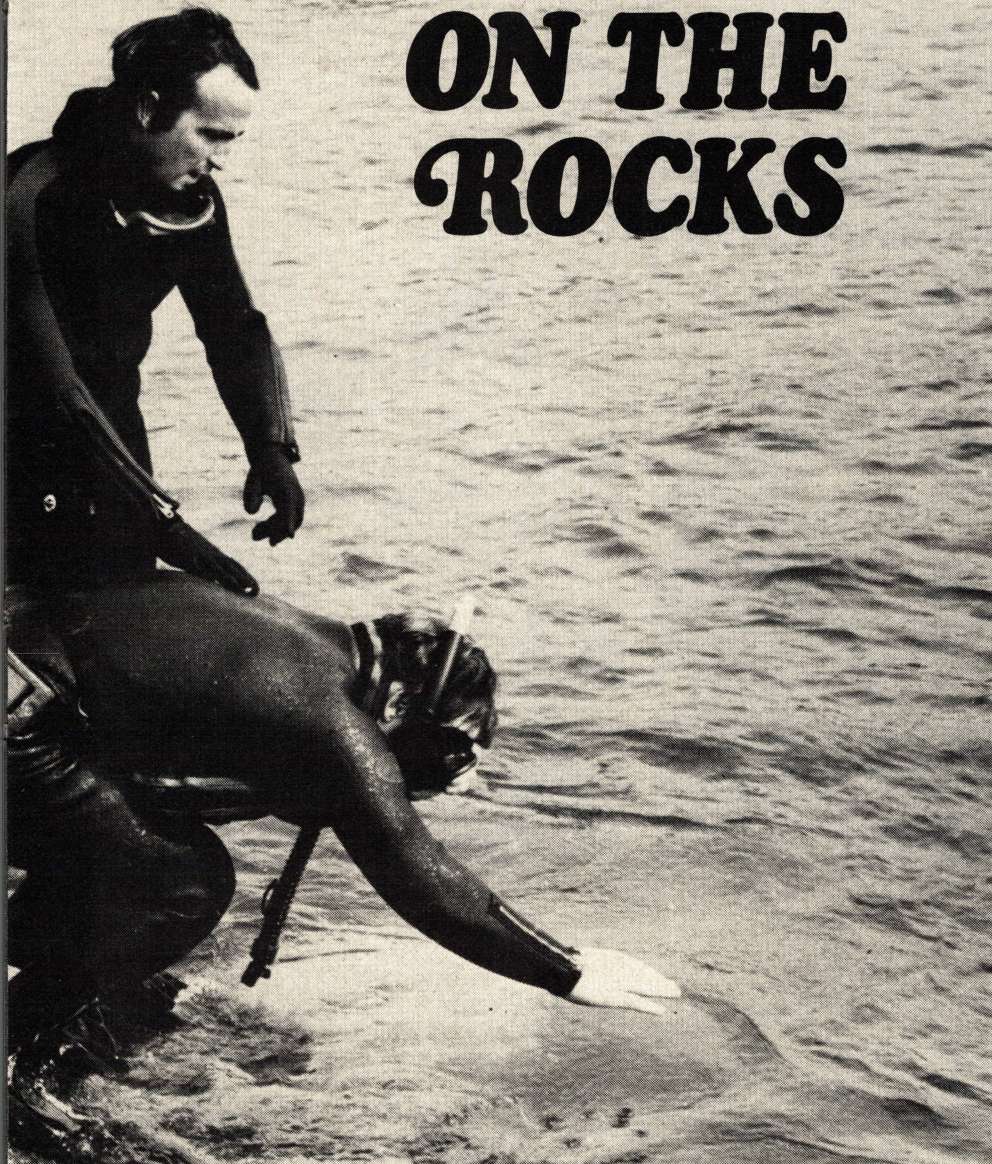
them and gradually move deeper as their breathhold time improves. A rocky beach offers scenery and marine life at all accessible depths.

Safe maneuvering over and around rocks requires an understanding of a few basic techniques and the patience to work with the water. The keys are: Stay low, move quickly with the water, and hold onto a rock to allow the water to flow over and around you.

When planning a dive to a rocky area it is important to be familiar with the

DIVING WHEN YOU KNOW THE SECRETS OF GETTING OFF AND

ON THE ROCKS



photographs by Karen Straus

locale and the effects tidal changes have on accessibility and ease of entry. High tide may change an easy entry point to an area of strong surge and wave-washed rocks. Low tide may create a drop-off which eliminates the area altogether for entry and/or exit.

I feel that it is critical for divers to master the skills required under the most adverse dive conditions. Once these are learned thoroughly and the diver has gained sufficient experience, there may be acceptable modifications.

For example, if there is no wave action or heavy currents and the bottom conditions are known, you may be able to walk in, carrying your fins. However, if the possibility exists that you might be knocked down by a wave or step into a hole, all of your equipment, including the fins, should be put on prior to actually making the entry.

I find it useful to describe rocky entries and exits according to three basic types of beach conditions and rock formations. A single rocky beach may be

Los Angeles/Orange County instructor Brian Miller gives encouragement to a basic student making his first entry off the rocks.

made up of areas of any or all of the three types. Where more than one type of entry/exit is possible, select the easiest one. Difficulties present themselves, they need not be self-imposed.

The techniques described here for the three types of rocky beaches are those I have found to be the safest under most ocean conditions.

TYPE I — Gradually sloping bottom with no clear channel of sufficient depth to allow progress around exposed rocks. A beach of this type usually dampens wave action and results in spilling waves rather than plungers or crashers. These conditions often tempt the diver to walk across the rocks to waist deep water prior to gearing up completely. The danger in this approach is twofold: First, loose wet rocks are difficult to walk on safely and there is risk of falling and/or twisting an ankle or knee. Second, trying to put fins on while floating and being washed around by the swell is difficult and may result in fatigue and a sense of being out of control before the dive has even begun. The properly executed entry under these conditions consists of three steps:

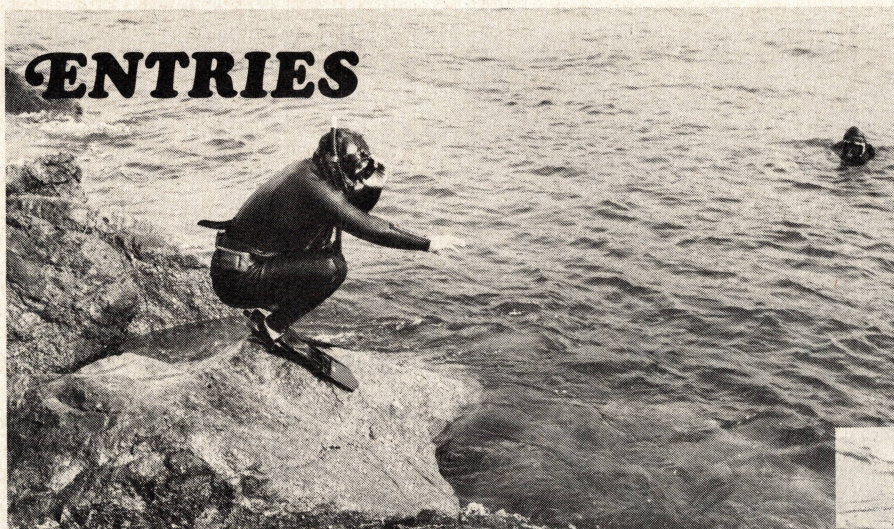
1. Find a solid rock to sit or lean on at the water's edge. Sit or lean with your back to the water. If a large swell does hit you, it is easier to brace yourself and lean into the water from this position. Put on any equipment you are not already wearing: gloves, mask and snorkel, and fins. Check to see if your buddy is fully suited and ready.

2. Turn to a hands and knees position and crawl carefully over the rocks until you reach water deep enough to float your body in a horizontal, face-down position. When a swell comes in and the water level rises, pull yourself over and around the rocks. If the receding water leaves you high and dry, wait for the next wave to float you again.

3. Continue pulling yourself along with your arms until the water is deep enough to allow a flutter kick. Hold your mask, duck your head and hold onto a rock to let the incoming water wash over and around you. Move quickly with the outgoing flow until you are beyond the breaker zone. Check your weightbelt to be sure it has not snagged on a rock and become unbuckled.

4. Exiting on this type beach is just the reverse of the entry. Kick in to shore on the backside of the incoming swells, allowing the water to float you over and around rocks. Hold onto a rock and let the outgoing water flow over and around you. When the water is too shallow to float your body, push up to a

ENTRIES



Whenever you're working around rocks, it's important to keep your center of gravity low. Stay crouched and keep your eyes fixed on the incoming swells.



Mask in place, snorkel in mouth, and BC deflated (so it won't puncture on the rocks) a basic student (left) waits for the right swell. Timing is critical in rocky beach entries and exits. Below (right), Brian Miller demonstrates a well-timed entry. After waiting for the water to reach its high point, he holds his mask, belly-flops onto the receding swell and rides it out. By working with the water, rather than against it, you can use its power to your advantage.



crawling position and pick your way carefully to a spot where you can sit and remove your fins.

TYPE II — Large rocks scattered so that channels and/or chutes leading to open water are visible. Under these conditions, the waves may break outside the rocks with white water surging up the channels and out again. Timing the incoming swell is critical to making a safe entry under these conditions and I consider this entry the most hazardous, albeit, the most exciting. The energy released when an ocean swell breaks on shore is concentrated as the moving water is funneled into a channel. This increase in the power of the water makes it difficult to maintain control and avoid being thrown against the rocks.

However, if the channel is short and the wave period is long, an entry can be made safely, as follows:

1. As in the Type I entry, find a rock to sit on or lean against as you finish gearing up. Remember to sit or lean with your back to the water.

2. Once your gear is on and adjusted, watch the incoming swell and resultant surge. Move out from behind your rock to a swimming position. Time your entry so you can fully utilize the power of the backwash to carry you clear of the channel before the incoming swell pushes you back to the entry point.

3. If you get caught by the incoming swell, try to find a rock to hold onto and allow the water to flow over and around you. Hold your mask securely and duck

your head. As soon as the force of the incoming water is reduced, start pulling yourself along and "wash out" through the channel to open water.

4. Exiting via one of these channels is very tricky and not recommended. If it is necessary to exit up a channel, the swell must be carefully timed: You must allow the front of the wave to pass over you and kick in on the back of the wave. Use the power and depth of the water to lift you up to the top of a rock where you can crawl to a position of safety.

TYPE III — Rocky outcropping or ledge dropping off into open water, accessible by foot. This condition provides the easiest rocky entry, but staying low and timing the swells is still very important. Standing upright and watching the

EXITS



To exit the water, pick a low flat rock with easy access to higher, safer ground. Again, timing is important. The object is to swim up the back of the wave crest just as it hits the rock. The water level will then be at its highest and the swell will lift you up and deposit you atop the rock in "elevator" fashion. If you miscalculate and become stranded halfway up, simply hold on, relax, and wait for the next swell to lift you up. The rock formations illustrating this article fall into the author's Type III category. This condition provides the easiest entry and is often used in training.



waves washing over the rocks at your feet may be the last thing you do before being dumped by a set, rolled around on the rocks, caught in a crevice or washed into the water minus some of your equipment. The entry should be approached with caution and a respect for the kinds of problems that might occur.

1. Before you approach the edge of the rock or ledge, sit down and put on all of your gear. Crawl to the edge of the rock, carefully watching the swells. If a big wave breaks, lie down on the rock and let the water wash over you.

2. At the edge, swing your legs over the side of the rock as if you were sitting on the edge of a pool. The entry is a sort of belly-flop from a seated position. Time the entry so you hit the water at

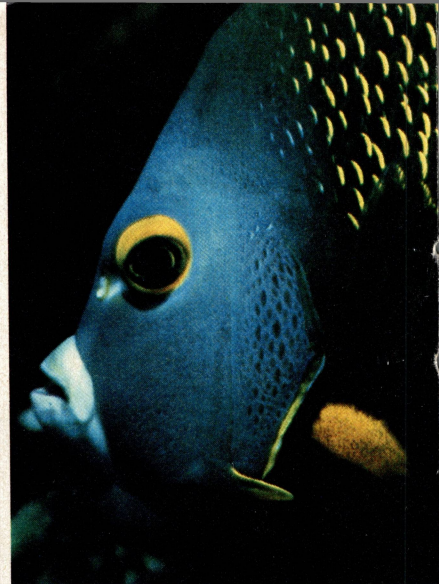
the crest of the wave (when the water level is the highest) and you will be carried away from the rocks by the backwash. Remember to hold your mask when making your entry.

3. The exit at this spot may be a little tricky and requires a good sense of timing to avoid tearing your wetsuit. Time your move so you swim up the back of the wave crest just as it hits the rocks. The water level will be at its highest and should lift you up to the top of the rock. If you miscalculate and become stranded halfway up the side of the rock, relax and hang there until the next wave lifts you up to the top.

Rocky entries and exits are generally done one diver at a time. However, both buddies should be ready at the same

time. One goes out while the other waits and observes. The second buddy enters the water when the first diver is in the clear and is facing shore, monitoring the second diver's entry.

If you have not tried rocky beach diving, ask other divers about spots they would recommend. Spend time watching others as they make their entries and exits. Practice an entry without your tank in order to get the feel of it. Remember to stay low and work with the water rather than trying to fight it. You are dealing with an irresistible force (the ocean) and an immovable object (rock) — with a little care and practice you can come between them without being crushed and an exciting and beautiful new world will be open to you.



UNDERWATER

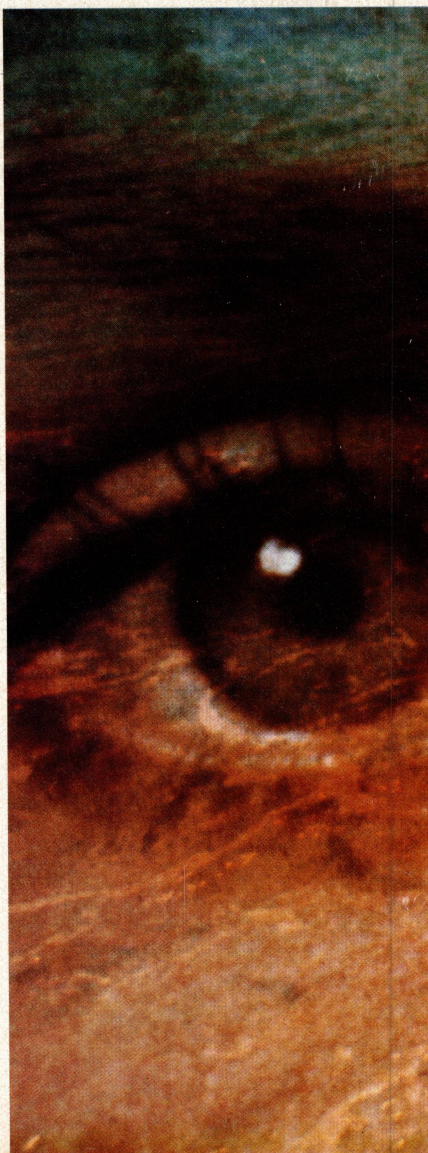
PHOTO

MA

It is an annoying fact for those of us who love to dive that we often spend much more time thinking about, planning for, or recollecting our dives than we actually spend in the water. For underwater photographers the problem is even more serious. We've often invested large sums of money in sophisticated equipment, we pour over the latest journal articles and make comprehensive tests of the newest emulsions. Yet when we return from our big dive trip of the year and the last good weekend of the summer is only a memory, we must face the fact that our photographic output has been less than prodigious.

In an effort to make my own measly collection of photographs from the past summer go a little further and provide a bit more creative satisfaction, I planned a series of projects for the winter. Since I couldn't go diving and take new pictures, I decided to make some photographs from the ones I already had.

The essential element in my plan was a slide duplicating attachment for my 35mm camera. The slide duplicator consists of a bellows extension which allows the



photographs by Bill Lovin



GIC

A CHALLENGING
PROJECT FOR THOSE OFF-DIVING
WINTER MONTHS

BY BILL LOVIN



camera lens to focus on a small area and a device for positioning a slide in front of it. Most often photographers use a slide duplicator for making exact copies of their most precious slides, correcting under- or over-exposure or cropping (enlarging a portion of the slide). But with a little planning and imagination the slide copier is capable of doing some fairly magical things.

COLORIZING

Perhaps the simplest bit of magic you can perform with the slide copier is to add to or change the colors of your slides. Using vivid color filters or theatrical gels, you can add striking color by copying your slide with the filter between your light source and the slide copier. Through experimentation you'll find that the color of the filter will combine with the colors of the slide to produce unusual results. Quite often you'll find that the filter will color the highlight areas most strongly, leaving the mid-tones more natural. Strong filters which are used on a relatively colorless or mono-toned slide tend to impart a heavy, overall color cast.

SANDWICHING

Sandwiching two slides and rephotographing the result is the simplest but one of the most effective ways of creating totally new images from your underwater and surface slides. Quite often slides that you might have considered rejects will make excellent sandwiches. This is because over-exposed slides work quite well for making sandwiches. Choose slides that have a single strong element, preferably against a light background such as a seagull against a bald sky and a shot of sea oats before a featureless background.

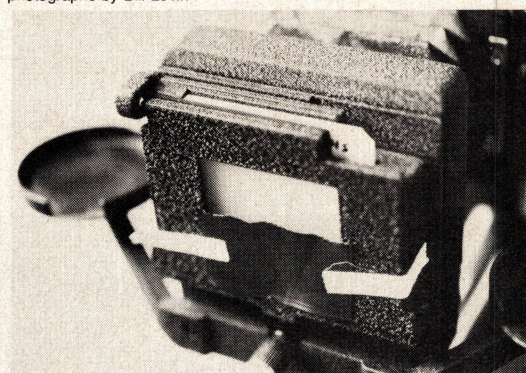
Striking silhouettes can be accomplished in the same manner. A seagull against a light sky can be sandwiched before a blazing sunset. There is a tendency for each of the slides in the sandwich to take on the color cast of the other slide so care must be taken to choose slides which will not produce an unpleasant color shift.

THE FISH-EYE EFFECT

For years I've admired the dynamic fish-eye photographs of people such as Rick Frehsee, yet I've never been able to justify the investment in a costly fish-eye lens for my cameras. However, with a perfectly round hole punched in a piece of opaque cardboard and my slide copier, I've been able to create a dynamic fish-eye effect with slides I already have. After examining fish-eye photographs in magazines, I chose some of my slides shot with a wide-angle lens which exhibited some distortion. Placing one in the slide copier, I held the cardboard with the hole in it against the slide and rephotographed it. The result was a somewhat distorted



photographs by Bill Lovin



Split-screen or matting can be accomplished by taping a piece of opaque black paper to one of the two slides you've chosen for a composite. The matte should obscure the part of the picture over which the other slide will be superimposed. The matte pack is then put in the slide copier and exposed.

round image which had the traditional fish-eye look.

DOUBLE EXPOSURES

Another relatively simple trick which can produce exceptional images is double exposure. Not all cameras are capable of making double exposures but most good quality 35mm SLR's can produce a double exposure with a little work. On some cameras you must rewind the film one frame after you've made your first exposure. Then you advance the film to cock the shutter and, finally, make the second exposure.

Double exposing works well for combining elements which are set against dark backgrounds. Two red sponges photographed at night can easily be combined with a photograph of a diver silhouetted in a mouth of a cave. Each slide in the combination is exposed nor-

mally, and care is taken to make certain that the light areas of each photograph double expose over the dark areas of the respective mate.

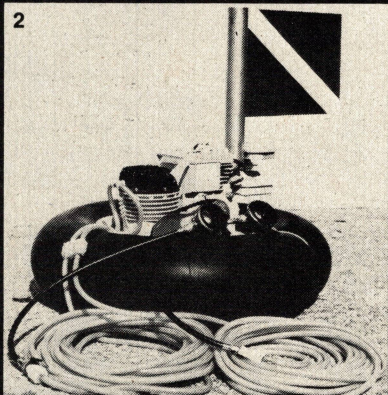
A grid of horizontal and vertical lines placed in the viewfinder of your camera is especially helpful in registering your double exposures. Using this grid it is a simple matter to super-impose a star highlight over the underwater light in a night diving photograph.

SPLIT-SCREEN OR MATTING

A logical extension of double exposure is combining images which do not have large dark areas where lighter elements may be inserted. Hollywood does this sort of thing all the time in films like *Star Wars*. And it is possible to achieve a similar effect on a somewhat less sophisticated scale with a slide copier.

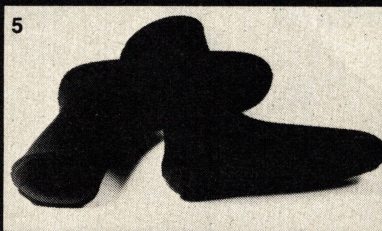
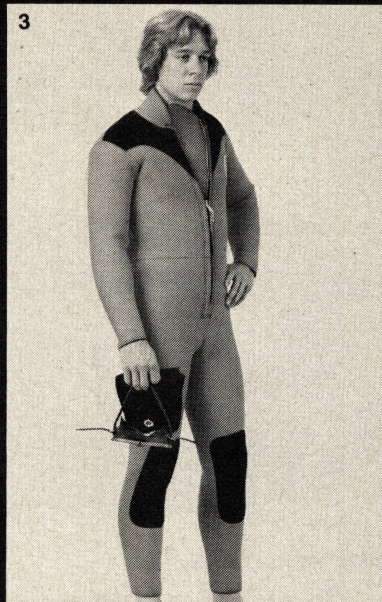
(Continued on Page 67)

New Gear



1 High Fashion Windbreaker — For lightweight warmth and protection. It has a snap-closed collar, elastic-closed cuffs and waist drawstring. About \$20. Carrying bag protects regulator and personal objects. About \$18. Sun visor caps off a smart look with solar protection. \$5. At your Scubapro dealer.

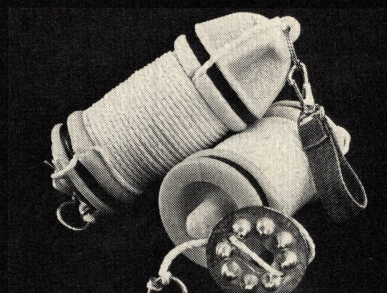
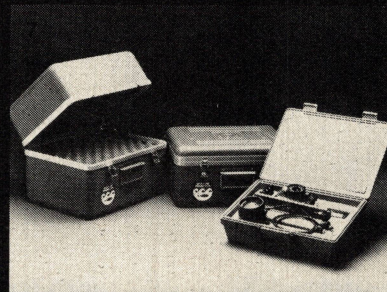
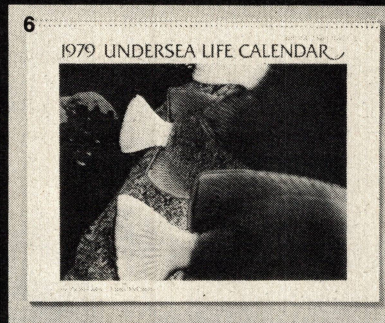
2 Super Hookah — Provides air for two divers at 30 feet. Designed for compact transportation and quick set-up, it weighs only 42 pounds and includes two 40 foot hoses, regulators, compressor, flag, float and inflator. \$415. From Innovative Designs, 1870 Oak Creek Drive, Dunedin, Florida 33528.



3 Custom Jumpsuit — An exciting new concept in wetsuits for greater warmth and versatility. The Series 600 one-piece design ensures a minimum of water exchange while providing a perfect fit. It's available in 1/8 to 1/4 inch, nylon I or II and various colors. Starts at \$200. At your nearby Imperial dealer.

4 Super Lux Mask — Designed for divers who demand the best, this is an exceptionally compact mask which provides maximum visibility. In black with red trim, it has tempered glass and a stainless steel rim. A double-edged seal guarantees a comfortable fit. \$15.75. From U.S. Nemrod. At your local dive shop.

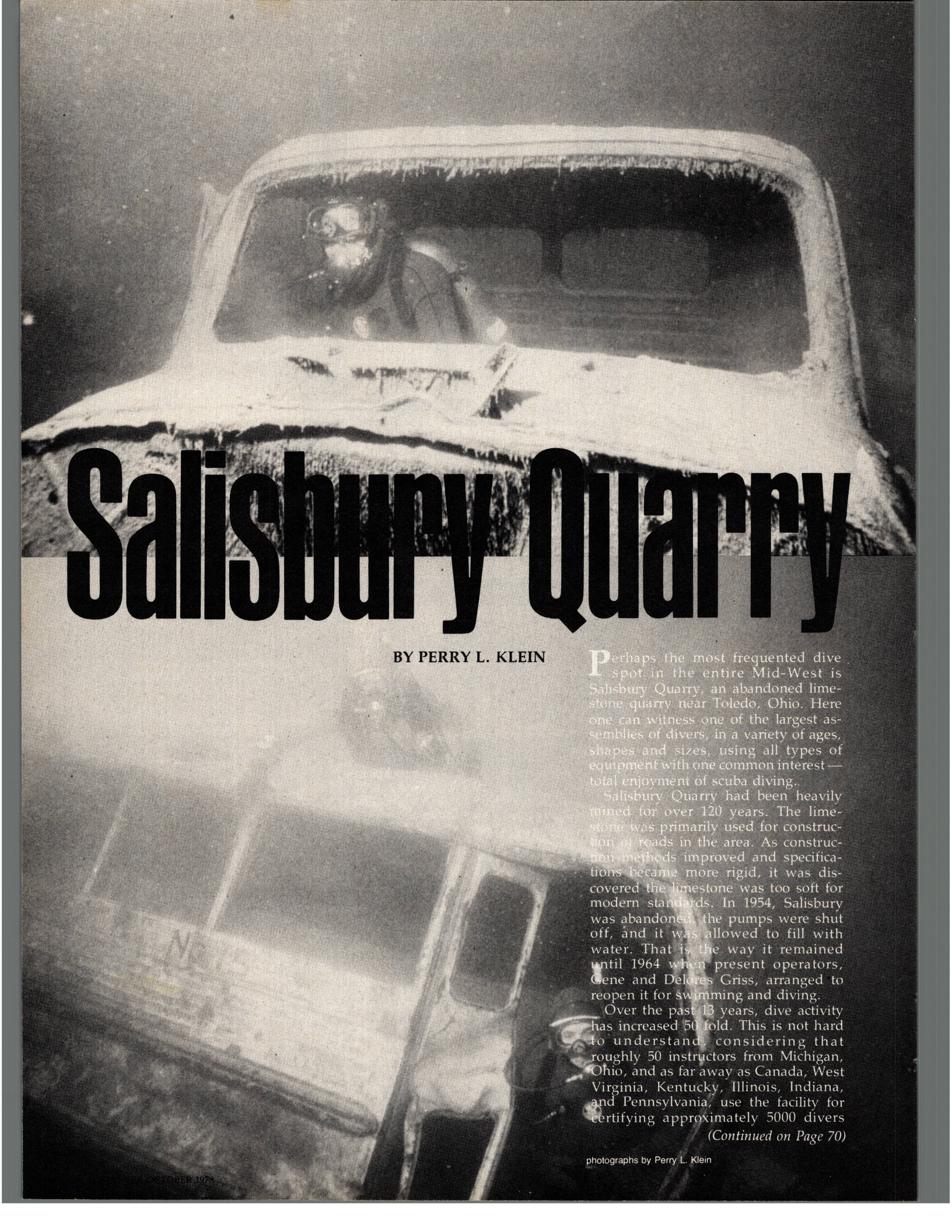
5 Molded Rubber Contour Sole Boots — For a comfortable, snug fit whether you're fin-kicking or walking across rocks. Constructed of soft but rugged 3/16 inch nylon-two material, these boots come in all sizes, from XS to XXL. \$20.75. From U.S. Divers. Available at your professional dive shop.



6 Undersea Life Calendar — A spectacular collection of color photographs by Edwin Janss of the marine life of the Pacific Realm. It includes 13 photographs suitable for framing. \$5.95 (Calif. residents include 6% sales tax). From Sub-Aquatics Press, 504 W. Broadway, Redondo Beach, CA 90277.

7 Environmental Cases — Designed specially for the diver who requires protection for valuable dive equipment. The two larger cases (13 x 17 x 14 and 13 x 17 x 9) are made of pressure-formed fiberglass and are O-ring sealed. \$139.50. From Farallon/Oceanic, 1333 Old County Rd., Belmont, Calif. 94002.

8 New Pelican Float — An improved version of the popular Pelican marker-recovery system. Lighter, brighter, and more buoyant, the float is available in fluorescent red or yellow and comes with 100 feet of 225 lb. test-tether line. \$18.50. From Pelican Products, 23763 Madison, Torrance, CA 90505.

A large, grainy black and white photograph serves as the background for the article. It depicts a car, likely a sedan, completely submerged in water. A scuba diver is visible through the front windshield, looking towards the camera. The car's interior and exterior details are somewhat obscured by the water and the grain of the photo. The title 'Salisbury Quarry' is printed in large, bold, black letters across the middle of the image.

Salisbury Quarry

BY PERRY L. KLEIN

Perhaps the most frequented dive spot in the entire Mid-West is Salisbury Quarry, an abandoned limestone quarry near Toledo, Ohio. Here one can witness one of the largest assemblies of divers, in a variety of ages, shapes and sizes, using all types of equipment with one common interest — total enjoyment of scuba diving.

Salisbury Quarry had been heavily mined for over 120 years. The limestone was primarily used for construction of roads in the area. As construction methods improved and specifications became more rigid, it was discovered the limestone was too soft for modern standards. In 1954, Salisbury was abandoned, the pumps were shut off, and it was allowed to fill with water. That is the way it remained until 1964 when present operators, Gene and Delores Griss, arranged to reopen it for swimming and diving.

Over the past 13 years, dive activity has increased 50 fold. This is not hard to understand, considering that roughly 50 instructors from Michigan, Ohio, and as far away as Canada, West Virginia, Kentucky, Illinois, Indiana, and Pennsylvania, use the facility for certifying approximately 5000 divers

(Continued on Page 70)

photographs by Perry L. Klein

IKELITE

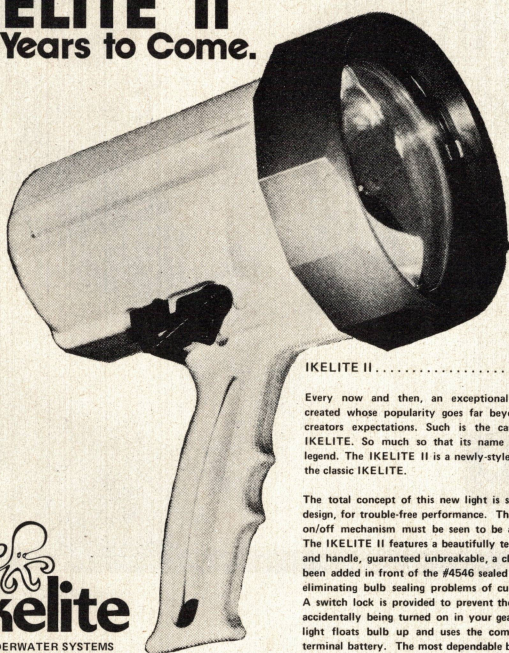
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IKELITE II \$19.95

Every now and then, an exceptional product is created whose popularity goes far beyond even its creators' expectations. Such is the case with the IKELITE. So much so that its name has become legend. The IKELITE II is a newly-styled version of the classic IKELITE.

The total concept of this new light is simplicity in design, for trouble-free performance. The innovative on/off mechanism must be seen to be appreciated. The IKELITE II features a beautifully textured case and handle, guaranteed unbreakable, a clear lens has been added in front of the #4546 sealed beam bulb, eliminating bulb sealing problems of current lights. A switch lock is provided to prevent the light from accidentally being turned on in your gear bag. The light floats bulb up and uses the common spring terminal battery. The most dependable battery/bulb combination available for your main lighting or back-up lighting system.

See the NEW IKELITE II at your local dealer.

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C-LITE I #1040
Greater intensity than lantern battery powered lights in the unique C-Lite shape. New push-on snap cap with all of the compact size and handling features of the C-Lite II. The special sealed beam bulb requires six "D" size alkaline batteries and produces 10,000 initial beam candlepower compared to the 6,000 candlepower of our famous Ikelite and other six volt lantern battery powered lights.

C-LITE II #1050
With ni-cad batteries and charger
The brightest rechargeable light in the industry. The push-on cap allows easy opening and sealing, and you can tell at a glance if the light is sealed properly. This light is guaranteed unbreakable and safe to a working depth of 800 feet.

INTENSITY: The C-Lite II provides about 25% more intensity than similar lights. A lantern battery powered light provides about 6,000 initial beam candlepower (as compared to 100,000 provided by the C-Lite II). The unbreakable lens cover in front of the bulb provides twice the beam concentration and intensity under water.

POWER: Six special ni-cad batteries provide a constant intensity for almost 1 1/2 hours between charges.

HANDLING: The compact size offers unlimited applications and mounting possibilities. It could easily adapt to an arm, belt or head mounted holster. Buoyancy is slightly negative, slowly sinking bulb up.

MOD • MODULE • MODULAR

CHANGE • CHANGEABLE • INTERCHANGEABLE

BRIGHT • BRIGHTER • BRIGHTEST



IKELITE MODULAR LIGHT

Available in clear or black unbreakable Lexan, push-on 'O' ring seal cap, rotating on/off switch, and switch lock. Available in either rechargeable or non-rechargeable models, with all battery modules interchangeable. The modular design allows for endless variations of usage - a battery module charging while using another, a non-rechargeable battery module as a back-up, a hand light one minute, a movie light the next, etc. No matter what model you start with, any of the battery modules can be interchanged in a matter of seconds.

MODULAR I

A battery module using 6 'D' cell flashlight batteries and the #4346 bulb. This light provides intensity unequalled by any popular priced light. This light's intensity is equal to two IKELITEs with 8 hours burning time on one set of batteries. Changing the batteries or bulb is a simple task requiring no tools.

MODULAR X

A battery module using 6 'D' cell alkaline batteries and the #4399 bulb. This light produces intensity almost equal to an IKELITE C-LITE II. Actually matches the brightness of many manufacturers rechargeable lights costing much more, plus this light burns for 5 to 10 hours on one set of batteries.

MODULAR SUPERLITE

A battery module with 7 rechargeable NI-CAD batteries, a 110 volt charger (12 volt optional) and a #4308 dual filament bulb. This light is unquestionably the world's brightest diving light. The dual filament bulb offers spot or flood lighting. Batteries reach full charge in 16 hours, may be charged in or out of the housing, burning time 1 hour on spot and 2 hours on flood. This same battery module is used to power the movie light.

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A bracket, mounting bar and 3400 degree Kelvin cinema bulb. Add this to the Superlite and you have a movie light which will attach to all IKELITE handle assemblies. The Superlite battery module used to power the movie light provides constant voltage until complete discharge. A full charge module will power the cinema bulb for 12 to 14 minutes.

THAT'S THE MODULAR LITE SYSTEM



Manufacturers of underwater lighting, direction, photographic equipment. Ask your pro shop or send \$1.00 for catalog and free "Capture the Sea" sticker.



Tennessee Mountain Diving



photograph by Dennis Salisbury

BY VESTA REA-SALISBURY

The early morning fog lay like freshly whipped meringue, making every turn in the winding, snake-like road difficult to navigate. Smoke was drifting lazily out of the chimneys of the scattered mountain homes as farmers drove their mules and plows over the rugged, rocky hillsides they call fields. It was spring and there was a chill up on the Tennessee Cumberland Plateau — a far better morning for deer hunting than a freezing dip in a stream-fed lake. As our car groaned up the steep incline and lunged forward around tight S curves, I wondered if this lake called Dale Hollow was going to be worth the anxiety of getting there.

The lake is located in a scenic valley halfway between Knoxville and Nashville and 40 miles due north of I-40 from Cookeville, via Highway 42. Part of it rests on the Kentucky line, but the majority of its 31,000 acres is in Tennessee. It is approximately 23 years old and has visibility up to 50 feet but averaging around 30 feet. Like many lakes, the visibility is best during the early spring and late fall. But even in the heat of mid-summer it is not uncommon to have 30 foot plus visibility off the sheer drop-off cliffs. The water clarity is attributed to the fact that 95 percent of the watershed is forest and shale. The shale not only performs as a filtering system but adds interesting color to the bottom with the orange, yellow, and rust shades of the rocks. In addition, the shale provides hiding places for the fish. Dale Hollow is noted for its huge bass

and trout and holds the world's record for the largest smallmouth bass and North American brown trout.

Skin and scuba diving in Tennessee starts early in the spring and drifts well into the fall past the hatching of the freshwater jellyfish. When the dogwoods and the redbud trees burst into glorious blossom, the carp begin their spawning ritual in the shallows of Dale Hollow Lake. They usually choose such unromantic places as the web of black willow tree roots that border the lake banks. During this period many native spearfishermen say the carp belch and moan and bellow as they wallow over the shale bottom. Personally, I consider these somewhat exaggerated descriptions; however, these U/W sportsmen are rather convincing.

Whatever the call, the divers — coming some distance — must hear something, for from April to early June, Dale Hollow is well blessed with red and white divers flags, spearguns, and anxious, wetsuit-clad, underwater hunters. It is more than just carp they are after, as any rough fish (gar, catfish, shad, drum, and suckers) are fair game. It is not uncommon for the persistent diver to bag a carp in excess of ten pounds or a drum at five pounds and being tempted by a bass is a regular occurrence.

Spearing of game fish in the "volunteer state" is looked upon by the Tennessee Wildlife Resources Agency as a crime deserving just short of the electric chair. In other words, the diver can

be fined up to \$300 and have his gear and even his boat confiscated and put up for public auction. There is actually no need for the diver to step beyond the law, for rough fish are very plentiful and give more of a fight and require greater skill in the hunt.

For the diver interested in finding something from his ancestral past, the hollow is the place to come. Artifacts left by the many woodland Indian tribes that called this area home can be easily uncovered by the diving treasure hunter. Perfectly shaped arrowheads are abundant. Hunting these interesting pieces of Indian lore can be done best after the Corps of Engineers drops the water level allowing the normally submerged islands to surface. By slow, shallow diving in about ten feet of water, and inspecting the crevices around the island's shale bottom, arrowheads can be found.

Arrowheads are literally everywhere and not difficult to find; however, there is more to this lake than spearing fish and artifact hunting — particularly if you happen to be a rock hound.

On the gradually descending 650 mile shoreline around the lake is a geological phenomenon called geodes. The geode is a round rock ranging from golf ball to baseball size in a copper-rust color. When the stone is broken open, the interior is hollow, containing attractive crystal formations that pick up the sunlight and sparkle like diamonds. The geode is often mounted standing upright on a piece



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of mirror or plexiglass and used as an interesting home conversation piece.

Another interesting activity revolves around the drum fish population. The Tennessee diver refers to these fish as the keepers of the freshwater pearl — in reality the ear bones of the fish. After the drum is speared, two chalk-white oval bones are removed from the fish's head. These bones, or pearls, are the size of a dime and are made into attractive jewelry.

Many divers choose to camp at First Island. If you desire some good Tennessee hospitality around the open campfire, this is the place to call home while on your Tennessee dive vacation.

If you are not a camper and want a soft bed and strong roof above your head, then you might be interested in the cabins and motels at Cedar Hill, Hendricks Creek, Willow Grove, Holly Creek and Horse Creek. However, make reservations well in advance for cottages and houseboats are booked solid during the summer months. If you are a camper but do not wish to be stuck on First Island, then you will find the Tennessee park system superb. There are 12 campgrounds around Dale Hollow Lake: Standing Stone, Overton County, Cove Creek, Dale Hollow Dam, Lillydale, Obey River, Pleasant Grove, Sulphur Creek, Willow Grove, Wolf River, and Dale Hollow State Park. A real treat at the end of the day is sipping Tennessee's Jack Daniels Whiskey and letting your taste buds marvel at Margaret Sproat's home-cooked barbecue at J & M Grocery, just above Holly Creek dock.

One problem you will encounter, though, is the availability of air stations. Unfortunately, they are few and far between. The only permanent compressor is located at Eagles Cove Marina, near Byrdstown, Tennessee. It is rumored that the compressor does not operate all the time, so it might be advantageous to call the dock before making a long run into the far recesses of the lake. (This dock is located about 19 miles from the dam. Telephone 615/864-3456.) The wisest thing to do to prevent disappointment is to fill your tanks in Nashville at either of the two existing dive shops — Neptune Equipment Corporation or Tennessee Divers, Inc. If you do not wish to stop at the capital city, the Skin Dive Shop (owned by Will Glen Crawford) is located in Cookeville, Tennessee. It is on the way to Dale Hollow if you are going to Livingston Boat Dock or the Lillydale and Willow Grove areas. If you come through Knoxville, Currant Enterprises, Inc., will be happy to fill your tanks. One way or the other air is obtainable, but it might be wise to fill more than one cylinder.



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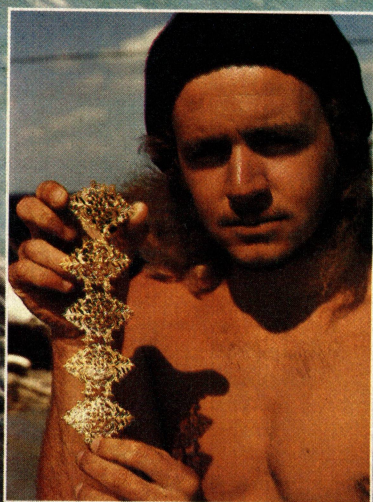
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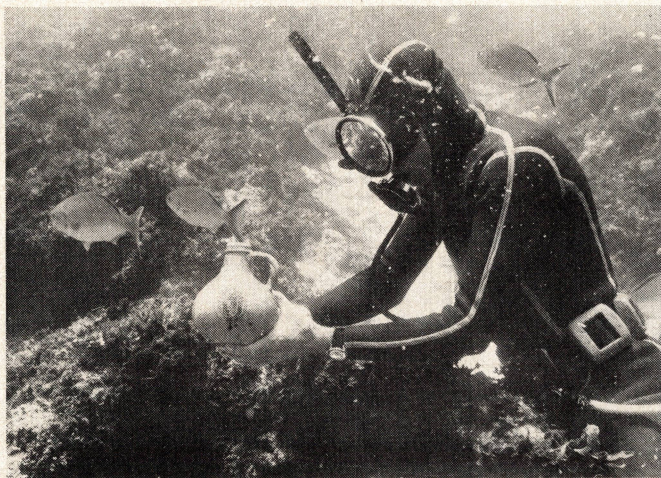


Shipwrecks

Research Techniques To Help You Find Them By Robert Marx



Searching for shipwrecks and treasure is certainly not a new hobby or profession—



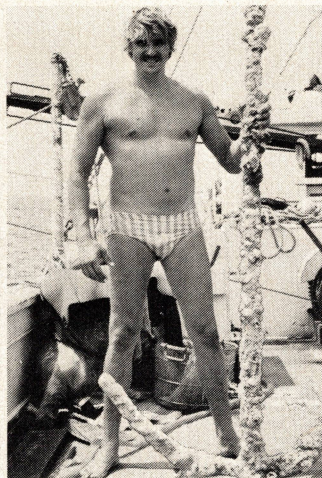
photograph by Pat Baker

people have been at it for more than 4000 years. When divers dream of sunken ships they generally concentrate on bulky Spanish galleons with holds crammed full of wealth. Actually the majority of the sunken treasure lying in American waters is on non-Spanish vessels such as paddle-wheel steamers lost on rivers, many different types of vessels lost on the Great Lakes and a myriad of vessels scattered along the coasts of this country. Of the more than 10,000 vessels lost in American waters prior to 1900, more than 95 percent were lost in less than 50 feet of water.

The key to success in locating shipwrecks is to do a thorough job of research. Failure to do so generally results in a great waste of time, effort and money. Like many others, I learned the hard way myself after numerous failures — all of which were the result of using phony treasure charts and data from fictitious books on sunken treasure. I eventually resorted to hitting the musty archives and libraries and amassed information on more than 30,000 ship losses scattered all over the globe. The material I unearthed led me to many wrecks and fills a massive book entitled *Shipwrecks of the Western Hemisphere 1492-1825*, published by David McKay Co., New York, N.Y. My purpose for writing this book was to save others from time-consuming, expensive research they would have to do if they were really serious.

There are other factual printed sources currently available for researching ship losses after 1825, the cutoff date in my book. This is particularly true for ships lost in United States' waters. The most reliable book is the *Encyclopedia of American Shipwrecks* by Bruce D. Berman, published in 1972 and still in print. As a result of eight years of intensive research the author managed to gather data on more than 50,000 wrecks in American waters. Of these, he selected over 13,000 and covered them in his book, excluding all vessels of less than 50 gross tons. A few of these are pre-Revolutionary War and his list includes ships lost up to 1971. Included in the data is the name, tonnage, type of vessel, year of construction, date and cause of loss and the location.

Another excellent reference book is *A Guide to Sunken Ships in American Waters* by Adrian L. Lonsdale and H.R. Kaplan, which lists 1100 sunken ships off the coasts of the United States as well as many in rivers and the Great Lakes. Although most of the wrecks mentioned in this book are also listed in Berman's, they are covered in somewhat greater detail. There are also dozens of other good books which deal with ship losses in particular areas or ships lost during specific eras. For the Great Lakes, I recommend reading *Memories of the Lakes* and *Shipwrecks of the Lakes* both written by Dana Thomas Bowen. New England area wrecks are dealt with in *Wrecks of Nantucket* by Arthur H. Gardner and *Shipwrecks of Cape Cod* by Isaac M. Small, both exceptionally interesting



Diver (far left) examines a jug discovered during the excavation of the 17th century Dutch wreck, Batavia. Author Bob Marx (left) proudly displays a 17th century Spanish anchor found in the Bahamas. Author of over a dozen books, Marx began his shipwreck research with the Civil War Monitor in 1955. He has explored shipwrecks around the world and duplicated Columbus' voyage across the Atlantic.

books. A good book on West Coast shipwrecks is *Shipwrecks of the Pacific Coast* by James A. Gibbs, Jr. River ship losses are partially covered in *Steamboat Disasters and Railroad Accidents* by S.A. Howland. For information on almost every military and merchant ship lost during the Civil War there is a 42 volume work entitled *Records of the Navies of the Civil War*, published by the U.S. Government Printing Office.

In addition to books there are a number of pamphlets published by various government agencies which contain wreck information postdating 1825. The best source is the Treasury Section of the National Archives in Washington, D.C., which will furnish the following reports for a small fee: *Marine Disasters North of San Francisco, California from January 1870 to August 1886*, *Marine Casualties on the Great Lakes from 1862 to 1873*, *Wreck Reports of the Great Lakes 1886-1891*, and *List of Wrecks and Casualties - Coast of Rhode Island and Fisher's Island 1752-1907*. This last report gives the location of 600 vessels.

Over the years the Public Information Division of the U.S. Coast Guard has also published lists of ship losses which can be obtained free of charge. Among the most interesting are *Principal Marine Disasters 1831-1932* (with data on more than 600 ships lost on rivers, lakes and at sea), *Life Saving Annual Reports 1878-1914*, and *United States Merchant Ship Losses: December 1941-August 1945*. Other good sources of information are the U.S. Naval Hydrographic Office and U.S. Maritime Commission, both located in Washington, D.C.

The most comprehensive general book on ship losses throughout the world is *The Treasure Divers Guide* by John S. Potter. Books have also been published in various foreign countries dealing with their own ship losses in areas other than just off their own coasts. For Spanish ships there are two major works: *La Armada Espanola* in nine volumes and *Disquisiciones Nauticas* in six volumes, both by Fernandez Cesareo Duro. For losses of French ships throughout the world consult *Histoire des Naufrages* in three volumes by Jean L. Desperthes. British ship losses are covered in dozens of books by various authors. The best work on British warships is *The Royal Navy* in three volumes by William L. Clowes. If your local library does not have any of the above mentioned books, including those published in other countries, they can be obtained through the Inter-Library Loan System.

Old newspaper accounts are also a valuable source of information on ship losses after the mid-17th century. On more than one occasion I have been able to identify or learn more about a shipwreck through newspapers.

To determine which newspapers were being published nearest to the site of a wreck you found, or one you are researching, it is helpful to consult the following sources: *History and Bibliography of American Newspapers, 1690-1820*, two volumes by Clarence S. Brigham; and the *Dictionary of*

Newspapers and Periodicals by N.W. Ayer and Sons, which covers the period up to 1880. The New York Times was founded in 1851 and is a very comprehensive source of information on ship losses of the later periods. Most libraries have indexes to all years of the Times and microfilms of particular issues or pages are easy to obtain.

Although original research undertaken in archives and libraries is by far the most rewarding, as well as the most challenging method of learning about ship losses, few amateur divers have the time or finances to pursue it. However, with a little patience and a small amount of money a diver can write to a particular archive — either in this country or foreign — and enlist the services of a professional researcher.

If you want to do research on British ship losses from original sources you can actually do it right in the U.S., without going to England. In 1740 a newspaper called Lloyd's List was founded and is still published today. It covered the movements of British shipping around the world, as well as brief accounts of ship losses and the movements of important foreign shipping such as the Spanish treasure fleets or ships engaged in the East Indies trade. Lloyd's List also contained information regarding the salvaging of ships. Until recently it was necessary to go to England to consult these Lists, which I have found invaluable in my own research. Recently, however, all of the Lists, dating from 1740 to 1900, have been republished in a multi-volume work which can be found in many large state or university libraries.

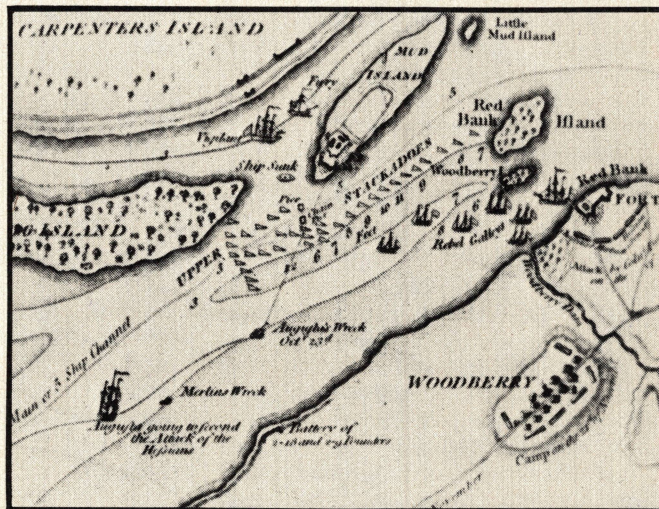
Before doing any research in United States depositories, either on American or foreign ship losses, consult the *Guide to Archives and Manuscripts in the United States* by Philip H. Hamer, to determine which archive or library will have the relevant material. The National Archives in Washington, D.C. is the most important source of ship loss data postdating the American Revolution, but there are many others with copious amounts of original documents as well. Each state has an archive which should be consulted for information about a wreck located in the waters of that state. In some instances many of the most important documents in state archives have been published as indexes.

As an example: If one is interested in ship losses off the coast of Virginia, the first step in researching them should be to consult the *Calendar of Virginia State Papers and other Manuscripts Preserved in the Capitol at Richmond* in 11 volumes. In addition to the state archives, many state and private universities have large manuscript collections. Some even contain abundant information from foreign archives. At the University of Florida there is a rich collection of documents on microfilm obtained from various Spanish archives which deal with early Florida history, including shipwrecks. The Bancroft Library of the University of California at Berkeley has a good collection of documents which cover ship losses dating back to the late 16th century along the coast of California. Many maritime museums also have original documents and microfilm. One of the most extensive collections is in the Mariner's Museum in Newport News, Virginia. The San Francisco Maritime Museum is the best source of information on West Coast ship losses, particularly for those lost during and after the Gold Rush. The indispensable reference on microfilm collections in the U.S. is Richard W. Hale's *Guide to Photocopied Historical Materials in the United States and Canada*.

Old maps and charts are often valuable sources for locating shipwrecks. In the course of doing research I have come upon hundreds of maps showing, with astonishing accuracy in some cases and equally astonishing inaccuracy in others, shipwreck locations. Three old charts showing the position of all 21 ships of a Spanish fleet wrecked during a hurricane in 1733 in the Florida Keys have survived the ravages of time. However, each of the three cartographers has placed most of the wrecks in different locations. The most accurate maps or charts pinpointing shipwrecks were generally those drawn by contemporary salvors.

In an article of this length it is not possible to list every available research source. The following example, showing how much material is available for one random area, should be helpful in indicating how one should approach shipwreck research. Assuming a diver has either found a shipwreck off the North Carolina coast and wants to identify it or wants to research first before going after a target, after thoroughly studying all relevant sources already mentioned in this article, he would turn to the following references.

There are two excellent books by David Stick listing hundreds of shipwrecks off North Carolina: *Graveyard of the Atlantic* and *The Outer Banks of North Carolina*. If the evidence indicates that the wreck was lost after 1749, or if one is researching a wreck postdating that year, when the first newspapers were printed in North Carolina, one would consult *North Carolina Newspapers on Microfilm* by Jones and Avant and their *Union List of North Carolina Newspapers 1751-1900*. Before researching any original documents one could refer to the *Index to the Colonial and State Records of North Carolina* in four volumes by Stephen Weeks, *The Colonial Records of North Carolina* in ten volumes by William Saunders and the *Guide to the Manuscript Collections in the Duke University Library* by Tilley and Goodwin. The best source for old maps and charts for this state, in addition to those already mentioned, is the Mariner's Museum in Newport News, Virginia, which has published a helpful guide: *Catalog of Maps, Ship's Papers and Logbooks*. Recently the Duke University Marine Laboratory

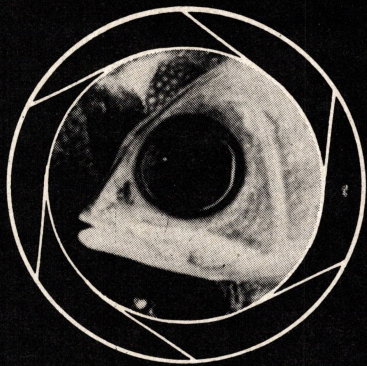


This chart shows the locations of three Revolutionary War wrecks located in the Delaware River, just south of Camden, New Jersey.

published *An Oceanographic Atlas of the Carolina Continental Margin* which contains a number of charts showing hundreds of sunken ships in North Carolina waters.

Another approach to gathering information is to talk with anyone who may have accidentally found a shipwreck. I have found local fishermen and shrimpers to be excellent sources for shipwreck locations. They also usually know the surrounding sea bottom as well as the palms of their hands and have often snagged objects from wrecks in their nets. Fishermen know that fish abound around wrecks and in many areas they have their own wreck charts so they can either return to choice fishing spots or avoid dangerous areas.

Before going after a shipwreck one should research the matter of laws pertaining to wrecks in the area he plans to work. Failure to do so could result in big trouble with the local, state or Federal Government — not to mention the dreaded nightmare of having everything found being confiscated. Many states now require divers to obtain a search permit before they even enter the water.



Beginners' Course In U/W Photography

BY JIM AND CATHY CHURCH

LESSON X: FIGHTING FLASH FAILURES

The purpose of this lesson is to help you avoid the frustrations of flash failures during your photo dives. The information here is divided into three areas: a basic overview of how the electrical circuit between a camera and flash unit works, techniques for cleaning and adjusting various contacts in the circuit, and troubleshooting techniques for cameras and strobes.

Because we can't possibly illustrate every point, we suggest that you place your camera and flash unit on a table top and examine each contact and part as you read this.

THE ELECTRICAL PATHWAY

A camera and flash unit are connected by two wires which run in parallel inside the cords and connectors of the system. Imagine electricity flowing through one wire from the flash unit to the camera. And when the camera shutter is triggered, a switch closes inside the camera so the electricity can flow back to the flash unit through the second wire. This circular flow (the completed circuit) triggers the flash unit.

At several points in this pathway, the electricity doesn't flow through solid wire — it must pass between pairs of contacts which merely press together. Examples of press-fit contact points are found between battery terminals and compartment contacts, connector and flash socket contacts, as well as PC cord connections.

Each set of contacts introduces another weak point into the circuit. Deposits and corrosion can build up and impede the flow of electricity; and if spring-loaded contacts are weak, solid contact may not be made. Although the resistance at any pair of contacts may not be enough to cause a flash failure, the combined resistance of several may weaken or break the circuit and cause the flash to misfire.

Electrical shorts can also disrupt the circuit. A short occurs when the electricity jumps over to the other wire instead of traveling around the entire circuit. This can happen when the insulation between the wires breaks down, or if electricity passes through moisture on wires or contacts. (Note: Although the flow theory of electricity is an oversimplification, it's a great way to visualize how your flash unit is triggered by your camera.)

X, FP AND M CONTACTS

Cameras usually have separate, built-in circuits for triggering either strobe or flashbulb units. Most conventional cameras have a selector switch for X (strobe circuit), FP (flashbulb circuit for focal-plane shutters) or M (flashbulb circuit for front shutters). The Nikonos camera doesn't have a selector switch. It has three contacts — X, FP and common — in the flash socket. The synchronization for X or FP depends on which contacts are built into the Nikonos connector that screws into the flash socket. The reason for including this information is that you may wish to identify specific contacts for performing ohmmeter tests.

CLEANING BODY CONTACTS

Remove the Nikonos inner camera body from the outer casing and proceed as follows:

1. Locate the three contacts just below the film cassette compartment. The front contact is X, the center is FP and the rear contact is common.

2. Look inside the outer casing and locate the three blade-like contacts just above the flash socket. These press against the contacts of the inner body.

3. Use an eraser to rub these contacts clean. If you see a visible deposit, moisten the eraser with alcohol or contact cleaner to improve cleaning. Blow out any eraser crumbs with air when you

finish. If the contacts are corroded, use an emery board to gently clean them. You can tape emery paper to a pencil eraser to reach the casing contacts, but don't press too hard as they may bend.

CLEANING FLASH CONTACTS

With a Nikonos II (or earlier model), the center contact is common. It is held in place with a screw at one end, and the free end can spring up and down like a miniature diving board. The screwhead to the left is the X contact, and the screwhead to the right is FP. Clean the screwheads with an eraser, and clean the diving board with a swab moistened with a small amount of alcohol or contact cleaner. Finish by blowing the socket dry with air.

With a Nikonos III flash socket, the contacts are in the form of three prongs protruding upward from the base of the socket. They can be cleaned with the swab and air as explained above.

With either a II or III, you can use WD-40 and a fine screwdriver tip to scrape deposits from the contacts. Should you accidentally get water in the flash socket, rinse with alcohol and blow dry with air as soon as possible.

CLEANING CONNECTOR CONTACTS

Nikonos connectors usually have only two contacts: common and either X or FP. However, the Nikon BC flash unit for the Nikonos III has three contacts in the connector — but the circuit is only wired for FP and common.

With the Nikonos II, the tab at the side of the connector presses against the center contact in the flash socket. Clean the end of this with the eraser or rough cloth, but don't use abrasives unless the tab is corroded. If the connector is plated, abrasives could damage this. The other contact may be spring-loaded and recessed in a hole, or may be blade-

like, protruding upward and inward from the side of the connector.

If the spring-loaded contact is gummy and doesn't press up far enough to reach the screwhead in the flash socket, put a small drop of alcohol on the contact and work it up and down to loosen it. If it still doesn't make contact, try placing a tiny ball of wadded aluminum foil on top of the contact as a temporary repair to fill the space. If the blade-like contact doesn't reach the screwhead, bend it upward slightly with needle-nose pliers or a fine screwdriver tip.

A Nikonos III connector may have spring-loaded contacts (as described above), or a split contact which spreads and fits over the ends of the prongs in the flash socket. Clean the split contacts with the end of a toothpick moistened with alcohol or contact cleaner and blow dry with air. If corroded, scrape very gently with a screwdriver tip. If you spread the contacts, use a fine tip to press them back together again.

LUBRICATE EO CONNECTIONS

The contacts on a male EO connector are the two copper bands running around the tip. These make contact with two bands in the female connector. Avoid using abrasives to clean these contacts as this could loosen the fit. If you are having problems, you might try wiping the connectors free of grease, applying a small amount of vinegar or contact cleaner, plugging the connector together and rotating it a few times.

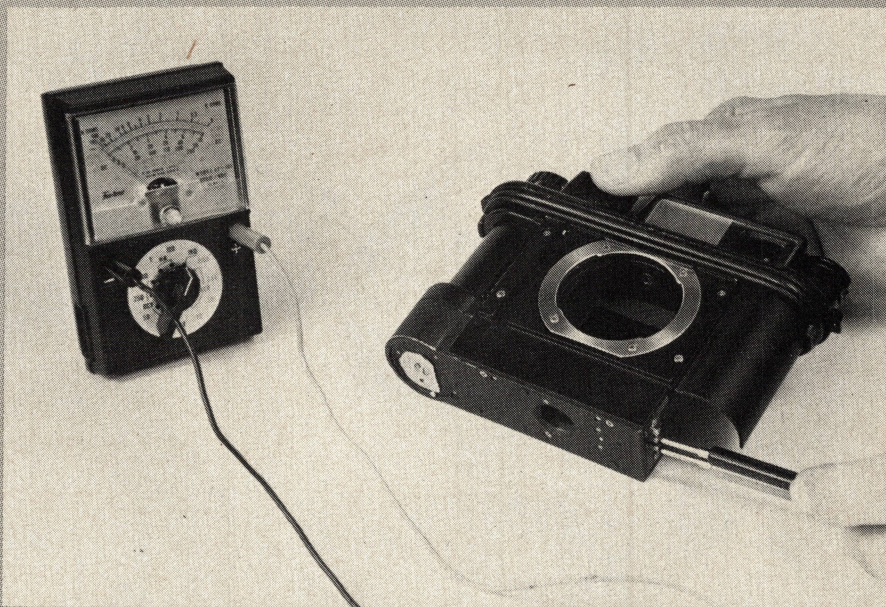
Lubricate an EO connection with silicone grease each time a connection is made. Some excess grease will "squish out" at the base of the connection. Wipe this off with your finger and use it to fill in the vent hole at the other end (or side) of the connection. Although the EO connection can be plugged in, or unplugged, while underwater, we prefer to make the connection in air, and use the grease to keep it watertight.

OTHER CONNECTORS

With other connectors — such as Sea Link™, Nelson or Ikelite — the same principles of keeping contacts clean and lubricated also apply. With some connectors, the contacts can be spread with a screwdriver blade to assure positive contact. As with the EO, we prefer to make connections in air and avoid attaching underwater even though they are designed as wet connections. Every little bit of resistance we can eliminate improves the reliability of the circuit.

CLEANING AND ADJUSTING PC CONNECTIONS

PC connections can be fussy. If the system has been exposed to moist, salty air (or drops of sea water), gently scrape the center pin and inside surface of the rim with a fine tip and rinse it with alco-



You can use an inexpensive (\$15 or less) ohmmeter to test cords, contacts and connectors.

hol. Use a toothpick moistened with alcohol to clean the PC flash socket. Blow the connector and socket dry with air.

The fit is often a problem. The rim of the connector may have spread with use, and the hole in the center of the socket may have enlarged with wear. To improve contact, you can bend the pin slightly off center so it makes positive contact at one side of the hole, and squeeze the rim of the PC connector with pliers so it grips the flash socket tighter. However, you may bend too much and damage the socket if you force the connector into place.

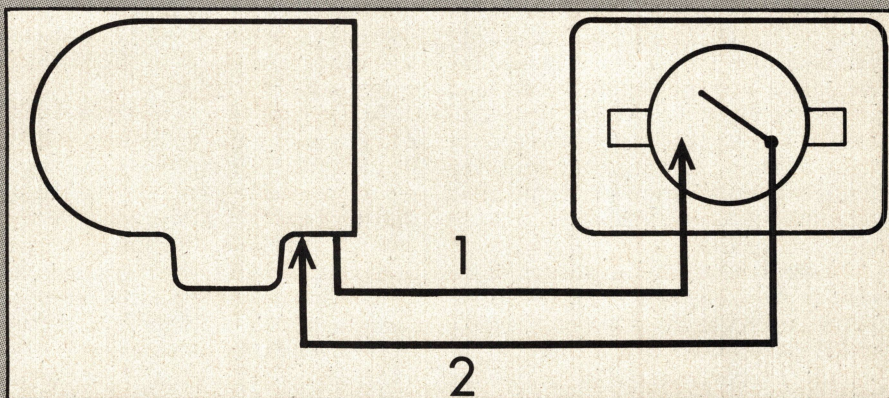
You can improve the fit with a PC Tip Conditioner (available for \$2.95 from Paramount Plastic, 769 Burke Ave., Bronx, NY 10467). It is a knurled brass rod with a hole, having beveled edge, at one end. Press the PC connector into this hole, and the rim of the connector will be resized to the correct diameter.

Don't rotate a PC connector when you plug it in as it could unscrew the socket connection inside some cameras. And when you have a PC cord plugged in and working, tape it in place so it won't work loose while you are underwater.

CLEANING BATTERY CONTACTS

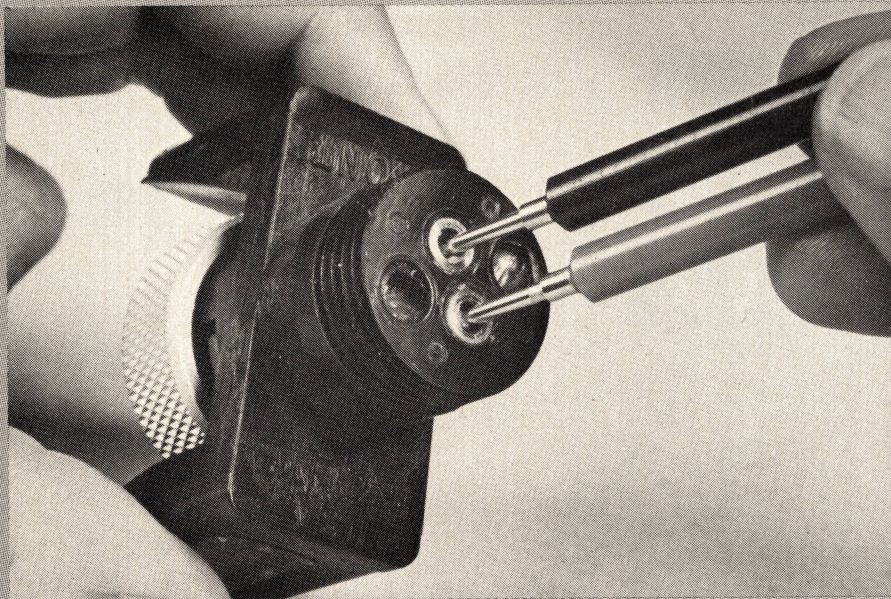
Clean the ends of size AA and C cells with a rough cloth or eraser, and use the eraser to clean the contacts within the battery compartment of the flash unit. One Kodak pamphlet (No. AC-4) recommends using a swab moistened (not dripping wet) with water to clean battery compartment contacts. However, because moisture is often a problem for U/W photographers, we use alcohol because it evaporates faster than water.

With strobes having removable, nicad battery packs, examine the pack to locate the terminals, and the compartment to locate the contacts. These contacts are often self-cleaning: The friction of terminals sliding against contacts wipes deposits off. A tiny drop of contact cleaner can help the self-cleaning action if the contacts appear dirty, and deposits can sometimes be cleaned off with a swab or air. In extreme cases, where contacts have a crust from arcing, you may have to scrape them clean with a screwdriver or abrasive material. Clean only one terminal at a time to avoid discharging the battery.



As the shutter is triggered, an inside switch closes to form a circuit with the strobe.

photographs and drawings by Jim & Cathy Church



The ohmmeter can be used to test connector adaptors (such as this Ikelite) for shorts.

Depending on the design, you may have to bend some battery compartment contacts slightly if they don't press firmly against the terminals. But avoid pulling up on those with a coiled spring appearance: You can pull them loose.

Do not clean battery terminals of 300 volt and 510 volt batteries — you could get a severe shock! The battery contacts of the Subsea Mark 150 dig into the terminals of the 510 volt battery for positive contact, and the Mark 100 contacts for the 300 volt battery are self-cleaning.

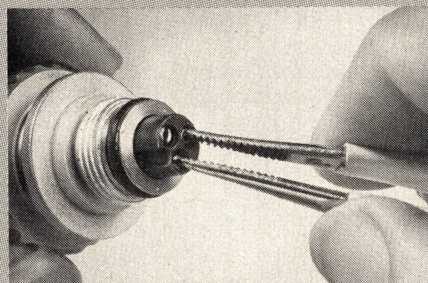
TAPE THE D-RING

Some cameras have D-shaped rings at each end of the camera body for attaching a neckstrap. With a Nikon F housed in an Ikelite housing, for example, this D-ring can swing over and touch the metal side of the battery compartment when you turn the housing to photograph a vertical format. This may cause the strobe to self-fire, and short the circuit so the strobe can't be triggered by the camera. Tape the D-ring in place or remove it entirely.

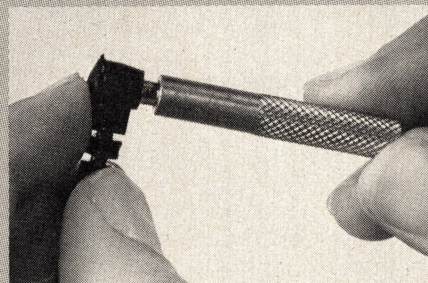
TESTING WITH AN OHMMETER

You can use an inexpensive (\$15 or less) ohmmeter to test cords and connectors which are free at both ends. The meter has a small battery inside, and when you touch the two test probes together, a dial on the meter moves to the right to show that a circuit has been formed. Because only a small amount of electricity is used, the meter will not give you a shock.

To see if electricity can pass from the contact at one end of a cord to the appropriate contact at the other end, simply touch each contact with a probe. If the needle moves, electricity is passing through the cord. This is called a continuity test — you want to see if the elec-



Shorting the Nikonos III connector.



Resizing a PC cord tip.

tricity passed through the cord. If the cord is broken, the needle won't move, and the cord flunks the continuity test. Finding the matching contacts is easy: With one probe touching a contact at one end, touch each of the contacts at the other end — one should show continuity.

To check for shorts, touch each of the contacts at one end of the cord with one of the probes. If the meter dial moves even the smallest amount, the cord is shorted and probably won't flash a strobe. Sometimes the small, inexpensive meters aren't sensitive enough to detect some subtle shorts. A larger, more sensitive (and more expensive) meter is best, but that's your decision.

As an added bonus, you can also measure battery terminal voltages with the meter, and can check the line voltage

when estimating recharging times. These tests are relatively simple, and the salesperson (and manufacturer's instructions) can show you how to perform them.

TROUBLESHOOTING PROCEDURES

The purpose of troubleshooting is to pinpoint the exact reason that your camera won't trigger the flash unit. For simplicity, we will always work from the camera to the flash unit even though you may modify this order in the field. In each step, except where an ohmmeter reading is called for, you are attempting to trigger the flash either with the camera shutter or by shorting contacts with a screwdriver blade or other insulated tool. Proceed through the steps until you locate the problem; each consecutive step assumes that the previous one failed to trigger the flash. Because of the Ikelite SST's electronics, you won't be able to perform every test, but you can do most of them.

TROUBLESHOOTING — NIKONOS

We assume that the camera and flash unit are connected together, but the flash won't fire when the shutter is triggered.

1. Remove the inner camera body. Touch one ohmmeter probe to the common contact and the other to the X or FP. When the shutter is triggered, the needle should move to the right to show continuity when the contacts in the camera close. If the needle moves without the shutter being triggered, the contacts are shorted. Assuming that the camera contacts are O.K., now proceed to the next step.

2. Use a broad screwdriver tip to short (by touching both at once) the contacts inside the camera casing, just above the flash socket. If the flash fires, the problem is probably bent contacts in the camera casing.

3. Unscrew the Nikonos connector from the flash socket. Short the contacts of a II connector with a screwdriver blade, and the contacts of a III with something like tweezers or a bent paperclip (which you can insulate with tape). If the flash fires, the problem will probably be either between the contacts of the flash socket and connector, or shorted flash socket contacts. Bend contacts as needed, and ohmmeter the flash socket contacts. If shorted, try rinsing with alcohol and drying with air.

4. If you are certain that the problem is between connector and flash socket, but can't find a reason, examine your flash baseplate. If you have mixed the equipment of different manufacturers, the baseplate may be too thick to allow the connector to seat properly.

5. If the flash didn't fire when you shorted the Nikonos connector, and the connector is permanently attached to the cord from the flash unit, jump ahead to the flash troubleshooting section. If you have a Nikonos/EO adaptor, proceed to the next step.

6. If you have an EO connection (Nikonos/EO adaptor), rotate the male connector and test flash again. If the strobe fires, this connection is poor. If the strobe doesn't fire, use your fingers to apply squeezing side pressure on the EO connector to press the contacts together as your buddy shorts the contacts. If the strobe fires, the problem is a loose EO connection.

7. Unplug the EO connection and short the contacts on the strobe cord. You can short the connector by pressing the copper bands against the metal cord fitting on some strobes. If the strobe fires, check the connector adaptor for continuity and shorts. Have your buddy wiggle the cord during the test to flex the wires and insulation. Remember, just the slightest movement of the needle of a small meter indicates a short. If the strobe didn't fire, go to the strobe troubleshooting procedures.

TROUBLESHOOTING — HOUSED CAMERA

We assume that your camera housing has a PC cord which is spliced to an EO, Nelson, Sea Link[®] or other bulkhead connector. If you have an Ikelite SST, not every step will apply to your system. Since you read the Nikonos section, we won't repeat basic ideas:

1. Ohmmeter the camera shutter contacts — touch the hole in the center of the PC socket with one probe and the metal of the camera body with the other.

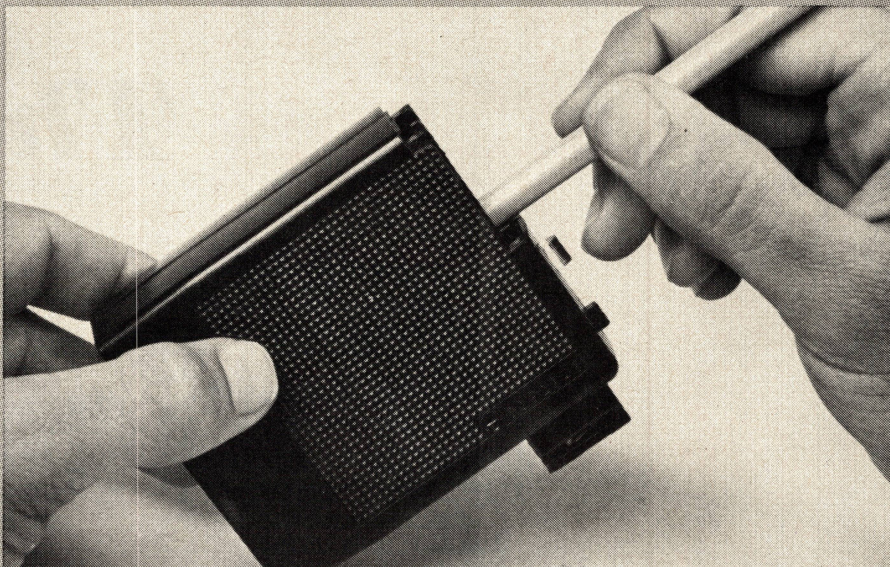
2. Short the PC cord by touching the center pin and outer rim. If the shutter contacts tested O.K., and the strobe fired when you shorted the PC connector, the problem is in the fit of the PC.

3. Unplug the strobe cord connector from the bulkhead fitting. If the strobe fires when you short the connector contacts, ohmmeter the PC to bulkhead cord for continuity and shorts.

4. If the cord checks out in step 3, the problem is in the connection between the strobe cord and the bulkhead connectors.

TROUBLESHOOTING — STROBES

With factory-sealed submersible strobes, you usually can't do anything if the strobe or cord are defective. With those that you can open up, you can sometimes make minor repairs if you have parts, tools and experience. With housed strobes, the problems are often in the wiring and PC connections. With these limitations in mind, the steps are:



Clean the contacts within the battery compartment of the flash unit with a pencil eraser.

1. See if the ready light is on: If the strobe doesn't flash, but the light is on, let it recycle for several minutes. If it fires with extended recycle time, the battery is weak. It can charge the capacitor enough to turn the ready light on, but not enough to power a flash.

2. If the ready light won't go on, check for a weak battery, a cell inserted incorrectly, or a loose or corroded contact. Test flash anyway — maybe the ready light burned out, but the strobe will still function.

3. With a housed strobe, ohmmeter the connector/PC cord system for continuity and shorts, check the fit of the PC cord and test the strobe by shorting the PC socket with a fine tip to flash it.

TROUBLESHOOTING — BC FLASH UNIT

This procedure applies to both new and old models of the Nikon BC Flash

unit for the Nikonos. To avoid consuming flashbulbs for testing, use the special test lamp designed for this purpose.

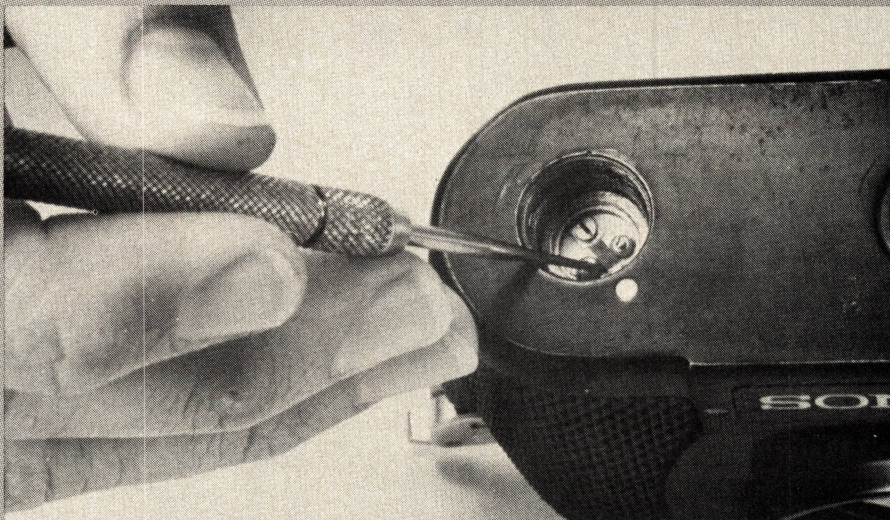
1. Wash the flashbulb socket with warm, running water — work the base of the socket up and down vigorously and operate the bulb release. Blow dry with air, and spray the socket with WD-40 to remove hidden corrosion.

2. Open the unit (at both ends with the older model). Locate the cord contacts at the base, inside the unit. Ohmmeter the cord for continuity and shorts.

3. Try to flash by shorting the contacts inside the inner body (those which contact the cord contacts).

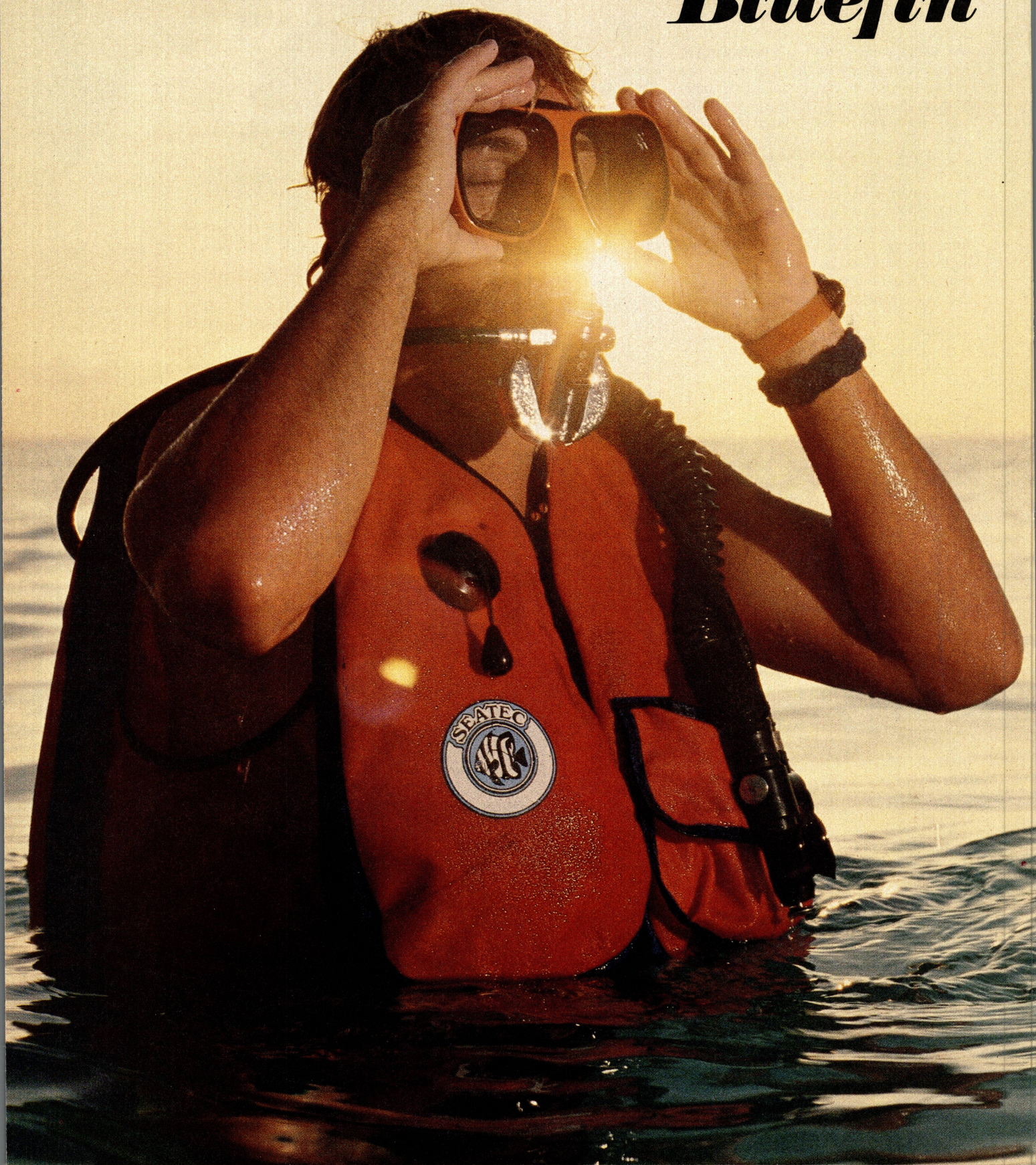
4. Clean the cord and battery compartments. Clean the battery terminals — replace the battery if necessary.

5. Clean deposits from the bases of unused bulbs which have been exposed to salt water. 



Use a fine screwdriver tip to gently bend the common contact of the Nikonos II upward.

The Seatec Bluefin



a new jacket compensator surfaces

By John Columbia

If 1958 was the year of the single hose regulator, then 1978 must go down in dive history as the year of the wraparound buoyancy compensator. Its significance should not be underestimated — no product concept has been so widely accepted so fast. Enthusiasm at dive resorts has been especially high, and many veteran dive guides have switched to jacket compensators.

The first of the second generation of wraparounds is the Seatec Bluefin — a carefully engineered, most attractive compensator.

In case you are not familiar with the wraparound jacket concept of buoyancy, it is deceptively simple. Split a horse collar BC down the middle, eliminate the crotch strap, add a little back buoyancy and holes for your arms. Because you wear it like a jacket, the arm holes take the place of your tank straps. With less straps, more even weight distribution, and buoyancy features that neither the back- or front-mounted units offer, it is definitely the trend of the future.

We were first introduced to Seatec's Bluefin at the 1978 DEMA Trade Show. Because of its instant acceptance by the dealers at the show, the factory sold out and it took us several months to get one for testing and evaluation. It was worth waiting for. The Bluefin is not only functional, it is good looking and fun to use.

The Bluefin is a double bag compensator — a design concept first introduced to diving by the Seatec company. Its inner bladder is heat-sealed urethane compounded from a special formula developed by Seatec president Harry Ruscigno. Designed to balance stiffness and strength for comfort, this urethane remains more flexible in colder water and has superior resistance to bacteria, ozone and ultra-violet light. A former Seatec exclusive, this urethane is now found in virtually every double bag BC.

The outer bag of the Bluefin is



photographs by Geri Murphy

Divemaster/instructor Al Zamrok tests the Bluefin off San Salvador Island.



Underwater, the Bluefin flattens against the diver's body and seems to become part of the suit. On the surface, the bag floats the diver high out of the water.

woven from 1000 denier Dupont Cordura Nylon backed with another special urethane called Super K. This fabric is one of the most desirable features on the Bluefin. It is a full 1000 denier — that's 580 nylon threads per square inch more than any other BC around. This adds up to more fabric per square inch and toughness. The Super K backing seals the nylon threads and prevents unraveling after cutting. Seatec calls this material "Tuff Tiger Threads" and makes it available in

a rich garibaldi orange or bright electric blue.

The Bluefin is admirably finished. All seams are double stitched and stress points are bartacked for extra strength. Grommetted with stainless steel, there are drain holes at the neck and bottom to vent off unwanted air or excess water. There is a large utility pocket covering the CO₂ detonator on the left hand side. The detonator for the CO₂ cartridge is pure state of the art: A fiberfilled plastic body for strength and cor-



The major difference between the Bluefin and other wraparounds is the flat panel which eliminates underarm bulkiness and allows freedom of movement on the surface. Automatic inflation is standard on the Bluefin and it comes with its own backpack. A large utility pocket covers the CO₂ detonator on the left hand side, and a specially threaded sleeve holds the 25 gram cartridge.

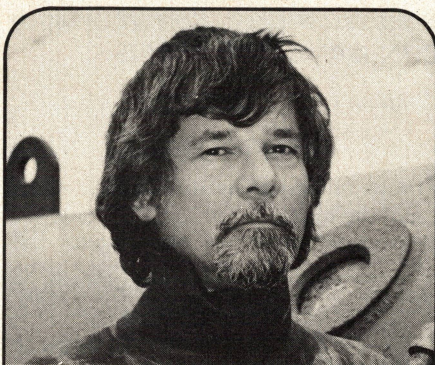
rosion resistance and a special threaded sleeve to hold the factory-equipped 25 gram cartridge. This sleeve is what the cartridge screws into. And, should the threads become corroded (they will eventually), the sleeve then unscrews along with the cartridge, eliminating about \$12 in replacement costs. Should this happen to you, most Seatec dealers will replace the sleeve for free.

Automatic inflation is standard, as is a backpack. But, if you are switching over, money can be saved by purchasing the jacket alone and adding your own system. One word of advice: Because the Bluefin contains its own waist strap and no shoulder straps, your modified backpack will be useless without the Bluefin attached. We recommend that you keep your old pack for a loaner and go with the complete Seatec system.

Diving with the Bluefin is a sheer joy. Because of its inherent softness and wide weight distribution, it is easy on the shoulders — especially sunburned ones. The significant difference between the Bluefin and other wraparounds is its stiff panels under the arms which hold the back and front of the buoyancy bag in place. With the waist strap snug, the Bluefin should not ride up when fully inflated. This panel does away with underarm bulkiness and allows freedom of movement on the surface. At maximum inflation, the bag floats you quite high out of the water and grips you firmly around the top of each shoulder. The sensation is like being lifted up above the water by a large hand.

Underwater, the Bluefin flattens up against your body and seems to become a part of your suit. We noticed that it tended to roll a bit in rough water as depth compressed our wetsuits. A slight tightening of the waist strap is advised at around 20 feet to prevent this problem. The large pocket is useful for the shell collector, but beware: It is only stitched at the corners and the area between the flap and the CO₂ detonator could be mistaken for an open pocket.

We think you will have to look hard to find a more functional piece of basic dive equipment. At around \$230 the Bluefin buoyancy system isn't cheap, but that doesn't mean it isn't a bargain either. If you are considering a step upward from your present buoyancy device, visit a dive shop and check out the Bluefin. >EFP



Robert J. Shourot

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U/W PHOTO MAGIC

(Continued from Page 50)

First, choose two slides which will produce an interesting image when combined, perhaps a shot of a diver in shallow water and a low angle photo of a dive boat. First a matte is cut from opaque black paper (the kind in which photographic paper is wrapped) and taped to one of the two slides you've chosen. The matte should obscure the part of the picture over which the other slide with be superimposed. The matte should not be in contact with the slide but should be far enough behind it so that the matte line will be out of focus when seen through the slide copier. The matte pack is then put in the slide copier and exposed. Be sure to carefully note the position of the obscured area.

The same operation occurs with the other slide. After it is matted, it should be placed into the slide copier so that it fills the matted area of the other slide with an image. When this slide is double exposed with the first slide, the images will be "married" into a final composite.

Much more sophisticated matting is possible if your slide copier can be fitted with a very accurate registration system. But even the simplest system, combined with practice and patience, can produce many unusual images.

Underwater photography, for many of us, is a creative and stimulating pursuit. With projects such as these, it can provide hours of personal satisfaction all year-round, limited only by our own imagination.

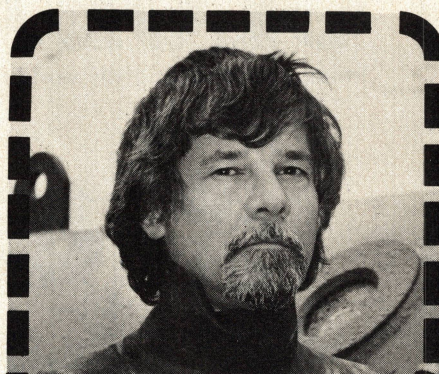
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Dive equipment manufacturers, dive shop owners, commercial, sport and scientific divers are encouraged to suggest areas to Sea Grant where research might benefit the community at large. Sea Grant then works with a state university which administers the program and completes the research.

In fiscal year 1977, 22 projects were funded. Categories included education, safety, physiology, resource research, and diver-related technology. Sea Grant also has an advisory service to assist interested groups in setting up workshops to stimulate ideas.

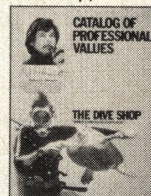
For the address of the Sea Grant Office in your state, write: Public Affairs Officer, Office of Sea Grant, NOAA, 3300 Whitehaven St. N.W., Washington, D.C. 20235.



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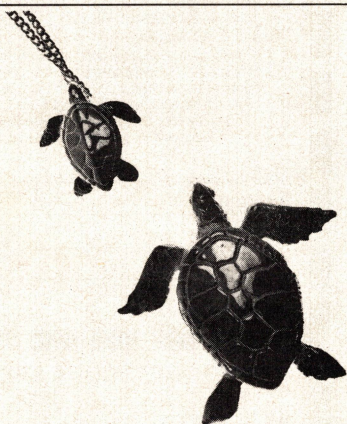
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CONSERVATION CRISIS

(Continued from Page 43)

terminated of fish by the wanton hunting of the tournaments. It is not only for the wasted life we mourn, but for the lost adventure, the irretrievable dive spot where humans could traffic among diverse and beautiful animals.

Responsible, careful divers, already avoid tearing a piece of coral, a graceful gorgonian or a live shellfish from a reef, because they know these take years to be replaced, and there are now millions of divers throughout the world. They avoid dropping the anchor off their boat in a coral community, because they know the anchor will devastate a piece of the reef. They never throw litter overboard and do not empty their bilgewater near shore.

We divers are privately responsible for our own safety while diving, and in the same spirit, we should extend our responsibility to the safety of the environment around us. Once the facts about marine vulnerability are disseminated — the task of groups like The Cousteau Society — then it is up to the enlightened diver to judge whether he is acting appropriately, whether his action multiplied by millions of other divers is sustaining or diminishing the inheritance of our diving children and grandchildren.

The Cousteau Society is a dedicated supporter of diving — of leisure-time exploration of the sea by every individual who is fascinated, as I am, by the undersea world. We want scientific diving to expand, and underwater photographic work to continually be refined toward great art. And I want my grandchildren to have the opportunity to see a carpet of millions of white squid eggs turning the sea floor into a field of pearls — of seeing the beguiling march of spiny lobsters — of seeing, as I once saw, a nation of flounder covering a sandy bottom, each peering up at our diving saucer through blazing green eyes, rigidly camouflaging their bodies so that the great yellow beast would not spot them and prey upon them.

Nowhere on earth are there so many reminders of the preciousness of life, the intensity of life, the beauty and diversity of life. These things are wildly joyous in the sea, and the human who visits there leaves with an exuberance for living. It's not too late, if we join together in concerted actions, to protest the cavalier and careless treatment of the sea by the profit-conscious and the egocentric.

During the next year, The Cousteau Society will be preparing a Marine Awareness Program which we hope will be integrated into existing dive instruction courses. Similar lessons are being created for boating safety classes

and other educational programs. By instilling a sense of personal responsibility in the minds of the coming generations of divers, and other ocean users, we hope to lessen the marine abuse of individuals — and to create a constituency for the sea which will force the major destroyers to halt their massive assault on marine life.

It is all of us divers, all of us who have explored this living treasury, all of us who have actually been into the sea and witnessed its value, who must unite to save it for our children. >»»»

TEXAS A&M RESEARCH ON PREGNANT DIVERS

Pregnant women who scuba dive deeper than 60 feet run a risk of harming their unborn children, perhaps fatally, a Texas A&M University study indicates.

Graduate student researcher Clifford Simmang says the fetuses of sheep showed a much higher susceptibility to get the bends than the mothers when dives were simulated in a hyperbaric chamber. Tests equal to a dive of 100 feet for 25 minutes were almost fatal, he notes.

"The bubbles in the fetal circulation caused by this dive were so massive that they most certainly would have resulted in death for the fetus if it has not been treated promptly. This should be viewed in the light that sheep and goats tend to be even more resistant to bends than man," he said.

The findings raise questions about increased sport scuba diving among women who may not know that they are pregnant, or among women who are pregnant but feel they are not advanced enough yet to curtail such activities.

Physiologist William Fife, who has supervised Simmang's research, explains that the results also have implications for females in the space program because of rapid decompression that might occur in space travel.

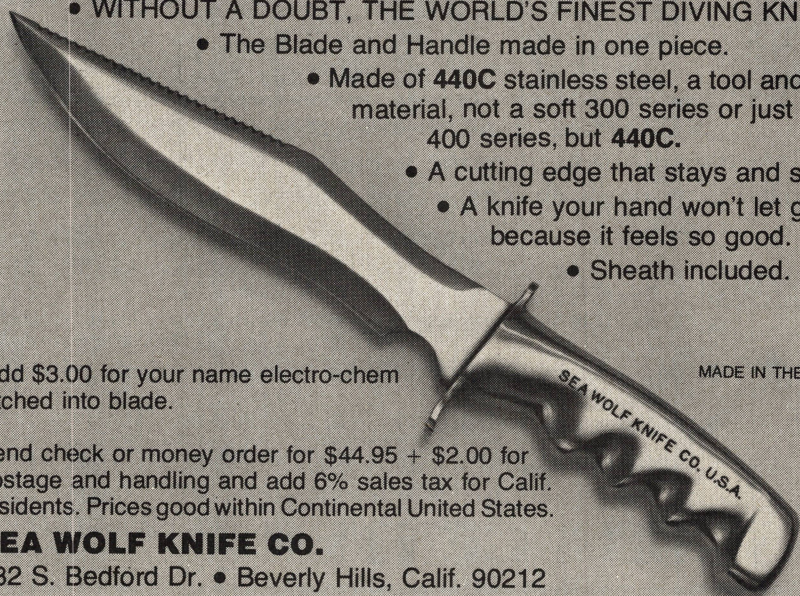
Simmang conducted the six-month study at Texas A&M's unique hyperbaric laboratory directed by Fife with assistance from veterinary physiologist Joseph Kitzman.

Pregnant sheep had a doppler ultrasonic transducer surgically implanted around an umbilical artery so that fetal blood flow could be monitored for bubbles, explains Simmang. "These observations suggest that it may be safe for pregnant divers to carry out shallow, short dives. But it is clear that even a standard sport dive approaching 100 feet presents risk to the unborn infant. Pregnant women should observe caution because at some depth, between 60 and 100 feet, a dive normally considered safe may be lethal to the fetus," he emphasizes.

Simmang carried out some of the surgical implantations himself. Like a number of other Texas A&M graduate students, he has studied such techniques required for research projects. >»»»

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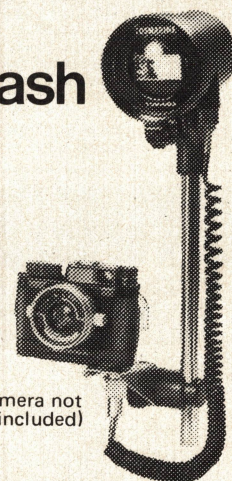
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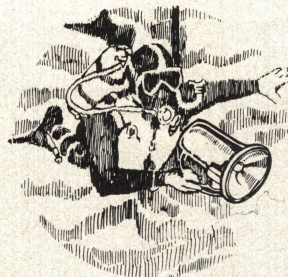


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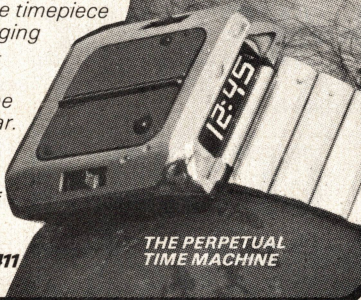
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SALISBURY QUARRY

(Continued from Page 52)

yearly. On a typical weekend you will see all types of classes being conducted, from basic and advanced, to underwater photography, salvage, and even instructor courses.

Salisbury Quarry is not limited to instruction, however. It is eight-tenths of a mile long and one-quarter of a mile wide — about 70 acres of water — with visibility ranging from 10 to 40 feet depending on the weather and time of year. This, combined with the availability of camp sites, rest rooms (primitive!) and a concession stand all contribute to make the quarry a desirable dive spot for the experienced diver as well. On an average summer weekend there are 300 to 400 divers exploring the depths of Salisbury.



Depths range from 10 to 45 feet with one trench as deep as 65 feet. There are many things to see: sheer limestone cliffs, railroad tracks left from the mining days and a large variety of freshwater fish. In Ohio, when a body of water fills, the state must stock it. Salisbury is well stocked with bass, bluegill, sunfish, catfish and more.

Local dive clubs have also made a contribution to the underwater seascape of Salisbury. They have placed three boats (ranging in size from 20 to 45 feet in length) on the bottom along with a school bus, Corvair (Ralph Nader would be pleased), and other interesting goodies to occupy the U/W enthusiast. Also, no boats are allowed on the quarry, eliminating the need for flag and float.

If you have only one tank, put your mind at ease. Gene Griss operates two air compressors and 20 tank, 3000 psi cascade system with which he fills from 100 to 300 tanks a weekend.

Salisbury Quarry is open from March 15th through November 1st. All that is required for admittance is a yearly membership card and a nominal entrance fee. Divers must have a certification card unless they are under the supervision of a certified instructor. To get there, take I-475. And, as you approach Toledo, look for the Airport Highway Exit which you will take west approximately two miles, until you get to Albon Road. Turn left on Albon, travel one and one-half miles south and you will see the sign. Good Diving!

SDM TRAVEL SECTION

WHERE TO GO/HOW TO GET THERE/WHAT TO DO

"Those who do not profit from history are forced to relive it." Anonymous.

If recreational report cards were given out for courses in Planning & Safety — 101, scuba divers would certainly score near the top.

So how come these same diving scholars often show up as class "retards" when it's time to take off on their long-planned Caribbean dive vacation?

You can find the answer to this and many other questions if you listen to a group of returning divers who have just blown a week's vacation because they did not plan ahead. You can talk to others who have been there and they'll be glad to share mistakes they've made but all too often the one-time diver to a specific dive spot doesn't even realize what he's missed.

A virtual Fort Knox of knowledge does exist in the minds of the professional divemasters who live on these Caribbean islands. They are in the water every day. And they see it all.

One of the most rapidly growing scuba dive meccas is the petite Caribbean gem called San Salvador, located in the southern Bahamas. It's also one of the most professionally run dive centers in the world, directly attributable to the drill sergeant organization of men such as Ron LeFebvre and honcho divemaster Chris McLaughlin.

When you are booked to capacity and repeat divers are making return reservations again for next year, you know you are doing things right. But are the divers themselves doing things right — are they getting the most from their dive vacations?

"No way!" sighs Chris McLaughlin, as we sip a cool concoction called Bahama Mama and watch the Caribbean sunset.

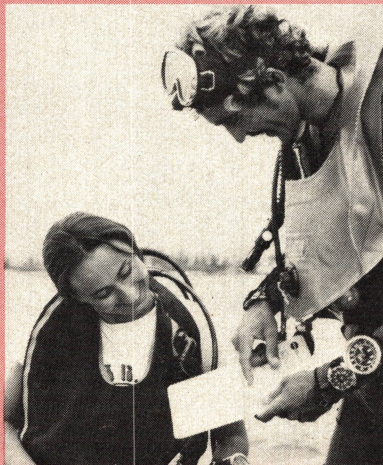
Chris' German background and desire for doing it right shows as we talk about mistakes he most often sees on dive boats.

"I can take one look at a diver's equipment as he gets on board and it tells me what kind of a diver he or she is. Then, I watch them suit up and observe how they handle their regulators. You wouldn't believe how many put their regulators on backwards which is a dead giveaway for their lack of familiarity with their equipment."

It's true that many who make a

PLAN THE PERFECT CARIBBEAN DIVE

By Paul C. Johnson



photograph by Paul C. Johnson

Caribbean dive trip may not have been diving for six months or more. They have a poor kick and are not comfortable in the water. Chris explained these are the dangerous divers — dangerous to themselves and their buddies.

Few divers realize that a dive-

master has the right to refuse to take a diver back on board if he has demonstrated he is a risk to his safety and the safety of others. Again, it's that failure to plan that gets them in trouble.

"About 20 percent of the new arrivals fail to plan their air. They're forced to the surface, often times at considerable distances from the boat. In heavy seas, that means trouble."

The use of decom meters as a substitute for understanding and working the tables also causes divemasters problems. When a divemaster spots a diver using both the meter and working the tables he respects that person as knowing what he's doing.

All too often a group of divers comes with a warped mental attitude. Instead of making it a leisurely, relaxing dive trip it becomes an obsession to see how many dives they can make, how deep they can go, and how fast a pace they can set. In this respect, male divers are the more frequent offenders. They're off on an ego trip trying to prove to themselves as well as their friends back home they fulfill the macho image.

Not all a divemaster's disappointments are related to his dive group's underwater skills. Much of his time is spent working with their equipment, or lack thereof.

"About 30 percent of the divers I see coming to San Salvador are bringing meters, and the number's growing every year. Yet, 80 percent fail to bring tables. Regulator malfunctions due to lack of servicing is also a problem.

Too often the airborne diver tries to minimize baggage thinking he can rent equipment when he arrives. That's fine if he's thinking in terms of lead, backpack, or

(Continued on Page 82)

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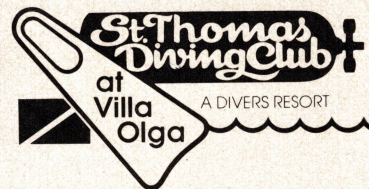
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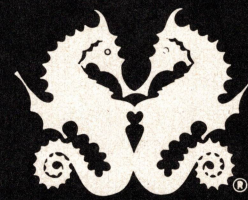
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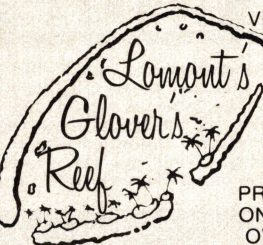
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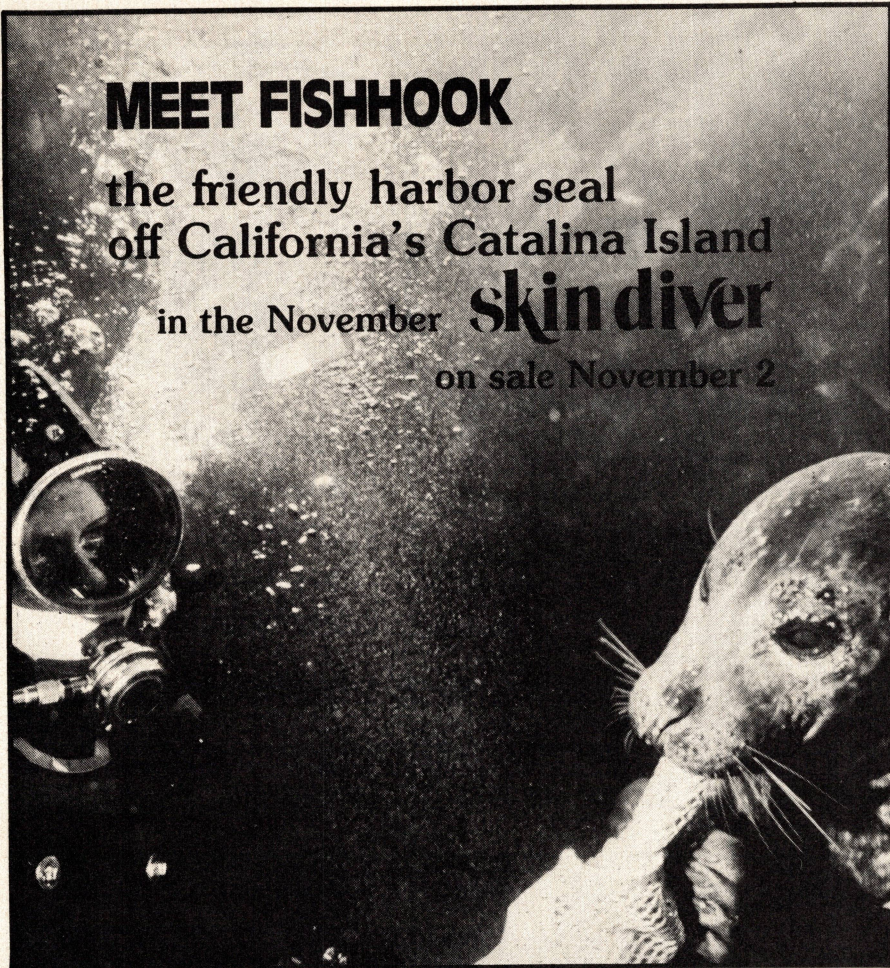
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PLAN THE PERFECT DIVE

(Continued from Page 71)

tanks. But it doesn't apply to specialized equipment.

"You'd be amazed how few divers come to the Caribbean with an underwater light. Either they have never thought about making a night dive or they think they can rent one after they arrive. What they fail to consider is that the average island dive shop may only have half a dozen rentals. And, with 40 or more divers all wanting to rent lights, somebody is going to find themselves trying to share one light with five other divers."

Aside from the obvious differences of salt water versus fresh water, what should a vacationing Caribbean diver prepare for? Having instructed for many years in the hinterland quarries, Chris is aware of the problems.

"I see it every week: First day, everyone's cautious. Then, as the week progresses they get careless. Surfacing too far from the dive boat is a sin that invites problems. In these waters you've got to budget your air, hang the decom line, and always surface at the boat."

So what causes most of the diver injuries? No, it's not sharks or giant barracuda.

"The sea urchins and the coral, particularly fire coral, are the #1 and #2 public enemies of scuba divers in the Caribbean. Most divers coming down here think because it is warm tropical water they don't need a wetsuit. They want spectacular U/W photos like they see in SKIN DIVER. I try to explain how to shoot from the proper angles and next thing you know they are lying among the coral. I spend a lot of time topside patching up scrapes and bruised egos," Chris said.

Chris sees the new arrivals spoiling their own vacations. While poor physical condition is obviously dangerous, Chris finds it's mental attitude that really messes up a diver's holiday.

"They arrive psyched up or psyched out! The macho divers grossly over-rate their dive abilities. They dive too deep and push the tables too far. They do not understand their own body physiology and, as a result, they compromise not only their own safety but that of their dive buddy as well.

"We try to explain to each incoming group of divers that the fish are friendly but they can and will bite. They all want to try their hand at feeding the fish — some ending up doing it literally. I personally

(Continued on Page 92)

An aerial photograph of St. John, Virgin Islands, showing a lush green coastline with a small sandy beach. The deep blue water of the Caribbean Sea surrounds the island, with several sailboats anchored in the bay. The title 'St. John—the quiet virgin' is written in a large, white, serif font across the top of the image.

St. John—the quiet virgin

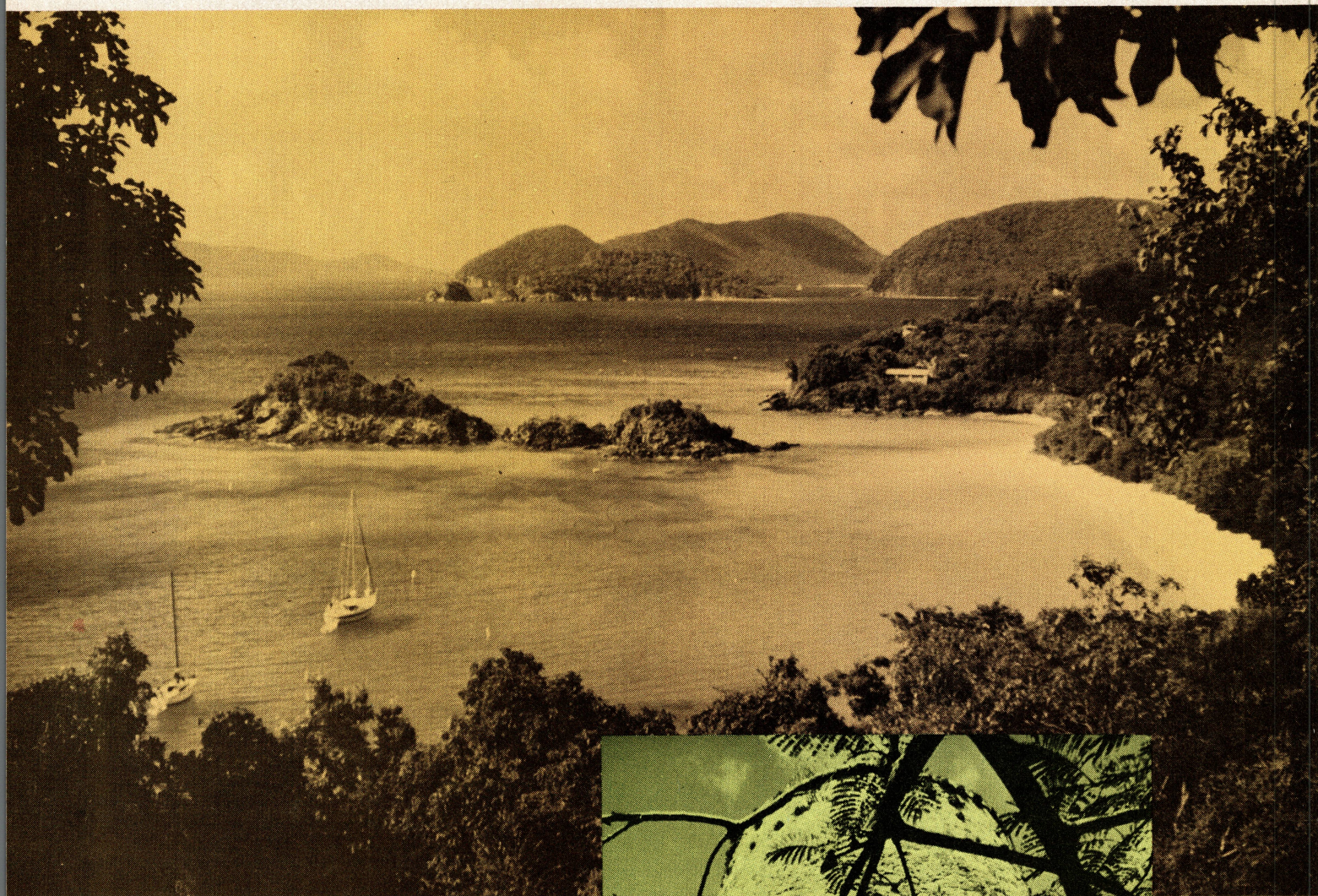
By Rick Frehsee

St. John was born quietly on the deep ocean floor, perhaps the original sea floor of the Caribbean. It was later brought to the surface in an explosive period by volcanic turmoil in the middle Cretaceous period, some 108 million years ago. From that time coral reef deposits laid down the complex series of rocks exposed today. Faulting, weathering, and a mantle of subtropical vegetation have softened its once jagged profile.

The smallest of the U.S. Virgin Islands trio which includes St. Thomas and St. Croix, St. John measures only nine miles long and five miles wide. It has a total of 19 square miles and is approximately the size of Manhattan. Viewed from sea level it is an island out of a fairy tale. It is lush, forested, and quite mountainous with deep V-shaped valleys; over 90 percent of its land surface is a 20 to 30 degree slope. The highest point on St. John is Bordeaux Mountain, which is 1277 feet high.

St. John is the most virgin of the Virgins, owing mainly to its smaller population and because two-thirds of the island is included within the boundaries of the Virgin Island National Park. Over 40 percent of St. John's beaches and hillsides are free and open to the public.

The population totals less than 4000. Most of the people live in or near Cruz Bay or Coral Bay which are on opposite ends of the island. Arriv-



St. John is by far the most virgin of the three major U.S. Virgin Islands. Above, a typical scenic view reveals lush forests, mountains, powdery beaches, and sparkling clear waters. It is an oasis of tranquility which offers a tactile sense of nature.

The rustic ruins of a vintage sugar mill remind us of a time when sugar was king on St. John Island. The massive wind-powered mill, one of the largest of the 25 active sugar producing mills on the island, was probably built between 1810 and 1830. Sugar, molasses and rum production ceased here by 1916.



ing on St. John for the first time, visitors are sometimes surprised to find little of the standard tourist paraphernalia. There are only a couple of gift shops and restaurants which cater specifically to travelers and night life is limited. In fact, there is practically nothing on tiny St. John but miles of history, beauty and natural charm. There are glistening bays, vine entangled ruins and the all-embracing sea which is rampant with living coral.

In reality, St. John offers the kind of vacation that most people need but rarely get: An opportunity to feel a oneness with nature far from the tedium of city life. About as many tourists as there are locals have visited St. John over the past year and more than half of these are skin divers. There are presently three major operations providing quality dive service in four locations. With dive sites numerous and good dive charters available, it is possible to get a good cross section of diving in a week's stay.

The coral reefs of St. John are basically close to shore as fringing or bank reefs, which usually have a recognizable attachment to the coastal rocks. Inside the bank reefs are shallow patch reefs in individual coral colonies which are perhaps only a few feet offshore, growing directly off submerged rocks and coastal rocks and ledges.

The shallowest fringing reefs — like those of the eastern end of Cinnamon Bay — are easily approached by snorkelers from shore on a calm day. White water and sea foam often mark these wave washed terraces. Only the heartiest of the corals survive here including the fire coral, *Millepora*, which needless to say, should be avoided. The first living stony corals are found along the seaward edge of the reef.

Typical of the Caribbean, sturdy golden trunks of elkhorn coral, oriented in the direction of incoming waves, create an independent zone, sharing their space with fire coral. Interspersed with the elkhorn are shallow water forms of staghorn coral and independent mounds of brain coral. Star and starlet corals are noticeably absent while seaweeds and sea fans are well represented. The face of this reef slopes about 45 degrees and is laced with delicate stony corals such as lettuce, tube and finger coral. To the astute observer there are various forms of shallow fringing reef development apparent in the crystal waters surrounding St. John.

In some areas the reef has extended seaward a football field or more in distance from the shore. This distance constitutes a bank reef rather than a fringing reef and its extension has created a broad reef flat only a few feet below sea level. The most mature reef profile is found at the east end of St. John, facing the windward side of the island. Here the reef is subject to continuous wave action since it faces the open sea. Because of this exposure there is a prolific reef crest with large volumes of water transported across the reef by waves. Some of this flow is reflected from the reef crest and funneled back into deep water through a system of sandy floored grooves cutting through the sloping water reef face.

In some places the fringing reefs have played a major role in the formation of salt ponds on St. John. It appears that reefs growing inward from opposing headlands eventually unite to become one continuous barrier across the bay mouth. This new pond becomes highly saline and supports little coral growth. Patch reefs located offshore from fringing bank reefs offer exciting dives. The species of corals are the same but differ from the immediate reefs offshore in that they are separated from land and suggest reefs growing on sea mounts. These probably represent regions of reef building dating back to shallower sea levels. As the water rose, reef growth kept pace with it, resulting in coral kept mounds in sharp relief from the flat surrounding shelf.

The coral landscape is typically Caribbean in zonation and species. While not overly colorful, it is somewhat unusual in shape and form and supports a good fish population. The off-

shore patch reefs offer an attraction for oceanic or pelagic species such as mackerel, kingfish, amberjack, bonita, and the occasional shark and sailfish.

There are impressive clusters of feathery black coral in relatively shallow water toward the seaward reef slope. On occasion we encountered colonies in 60 feet of water. There are several dive sites that should be noted; these include Caravelle Rocks, and areas around Congo Key which have underwater scenery comparable to Caravelle Rocks. The most spectacular dive here is one that offers a seaward glimpse of the reef slope continuous to the rocks above. On the inside there is a lovely isolated coral head in about 45 feet of water. It rises off the sandy bottom in a mushroom formation that supports a large population of silvery fry, which graze above it like insects attracted to a night lantern. Johnson Reef, off of Cinnamon Bay, is an island awash — a sea mount rising from a 70 foot flat. Also close to St. John's resorts and facilities is Stevens Key, supporting a gorgeous little reef on the western side; Mingo Key with a super reef formation in 50 feet of water; and the reefs of Lavango Key.

CARAVELLE ROCKS

Caravelle Rocks is an excellent dive spot with both shallow and deep areas of mountainous scenery and more than average amounts of game fish.

On a dive here, a magnificent school of silvery tarpon knifed into a mild current ahead of me at the edge of visibility. We angled through an opening in the rocks toward the great fish, timing our kicks to take advantage of the shallow surge. Charlie Smithline, the resident chief divemaster from Caneel Bay, was pointing and hooting through his regulator reminding me of his promise that we would see large numbers of these splendid beasts precisely at this location.

I had seen tarpon before, but never anywhere near this many. Native to my home state of Florida, they migrate up and down both the eastern and gulf coasts, well inside the reefs and usually in murkier waters. They are among the most primitive of bony fishes, related to mundane mullets, bonefish and ladyfish, but their visual impact is astounding. Tarpon are among the boldest of game fish and their large silvery scales reflect sunlight with the intensity of mercury.

After I got past the initial excitement of shooting a dozen or so photographs, I stopped to count. There were 40 or 50 within easy range. The largest of them was perhaps five feet long, while the average fish was about three feet. They would take their space in the water column in reference to one another in typical schooling behavior, then suddenly, one or two would lunge out at the myriad of silver fry that undoubtedly was the source of attraction for the great school.

It's really impossible to sneak up on tarpon. They will either let you get close or not, depending on mood and circumstances. In addition to the sensitive lateral line along the length of their body which picks up mini-vibrations from considerable distances, tarpon also have excellent eyesight.

I was lucky this time, however, and with some care could swim within four feet of them. They were fairly patient with my presence but they reacted to both my exhalations and the flash from my strobe, bolting forward each time. Fortunately I remembered to underexpose a full stop to compensate for the subjects' high reflectivity.

LIND POINT

Off Lind Point we made an exciting night dive. A 45 degree reef slope gives way to a sandy shelf 50 feet below. At night the reef changes its character. Parrotfish are found asleep in their mucus sacs, nestled beneath overhangs and ledges. Spiny lobster bound from coral to crevice in the moon-like gravity. Gorgon's head or basket starfish display writhing tentacles among feathery seaweeds.

Other areas further away, but reachable by dive charter, include the Caves of Thatch with numerous undersea caverns and, just east of Peter Island, some 16 miles from Cruz Bay and 8 miles from the nearest point of St. John, Blonde Rocks. Here, golden coral mounds just 25 feet below the surface drop off on all sides featuring small caves, pot holes, overhangs and traverses. The rocks ascend in two peaks, with a drop-off to the sand in between, creating a kind of underwater amphitheater.

CANEEL BAY

While St. John supports no highrise motels, there are magnificent accommodations available at Caneel Bay. The Caneel Bay Plantation is located upon lush, well-kept grounds. It is without a doubt one of the finest resorts in the world, offering complete dive operations and services. A few minutes drive from Cruz Bay, Caneel Bay offers an environment that is both beautiful and glamorous.

Caneel Bay Plantation first opened in the 1930's, on the site of a historic sugar plantation. In 1952, Lawrence Rockefeller purchased the small resort, developed it and donated it to the Jackson Hole Preserve, Inc. This is a non-profit, conserva-

and guides. Caneel offers full dive services including rentals, dive charters and complete open water instruction, from snorkeling to scuba gear, in a few days' time. A number of well equipped outboards and Flattops are on hand for half and full day charters and a beautiful 40 foot catamaran sailboat is available for day and overnight charters to the nearby British Virgin Islands and exotic Anegada Reef.

The Caneel Bay Plantation as a whole is a visual and emotional experience difficult to portray by word or photograph. The landscape is so lush and romantic that it might be portrayed as the ideal spot for a skin diver's honeymoon. While certainly not inexpensive, Caneel Bay Plantation is a bargain in what you receive in atmosphere, menu and services.

CINNAMON BAY

For a completely different approach to accommodations on St. John, vacationers who can rough it a bit would enjoy camping out at Cinnamon Bay Campgrounds. Here, under the direction of the National Park Service, a complete camping package is organized for you. For \$13 per day you can rent a six person tent with sheets and towels, a cooking kit, picnic table, barbecue pit and gas lantern. There are electrical out-



Charlie Smithline, Caneel Bay Resort's chief divemaster, leads a group of beginner divers on their first open water excursion. Caneel Bay teaches both snorkeling and scuba diving and offers trips to the popular wreck, the HMS Rhone, of THE DEEP fame.

tion-oriented organization, founded and supported by the Rockefeller family. Caneel Bay is owned by Jackson Hole Preserve and managed by Rock Resorts, Inc. Any profits are devoted to the maintenance operation and improvement of the facilities. Jackson Hole Preserve and the Rockefellers donated over 5000 acres of the island to the Federal Government in 1956, which created a national park with them.

The Caneel Bay Plantation is ringed with seven powdery beaches and is dedicated to tranquil recreation, offering visitors close contact to the natural surroundings. The resort offers full services of all kinds, with transportation by air, land or sea; its own fleet of ferry boats; a full itinerary of outings, side trips and explorations of the island, fishing and tennis; and an excellent menu for breakfast, lunch and dinner. The nighttime menu is so extensive that it is difficult to do any more than sample it within a week's stay.

The dive services at Caneel have been developed mainly through the efforts and experiences of its resident chief divemaster, Charlie Smithline. Charlie has 20 years experience in the dive industry, both stateside and throughout the Caribbean. Under Charlie's leadership is a staff of dive instructors

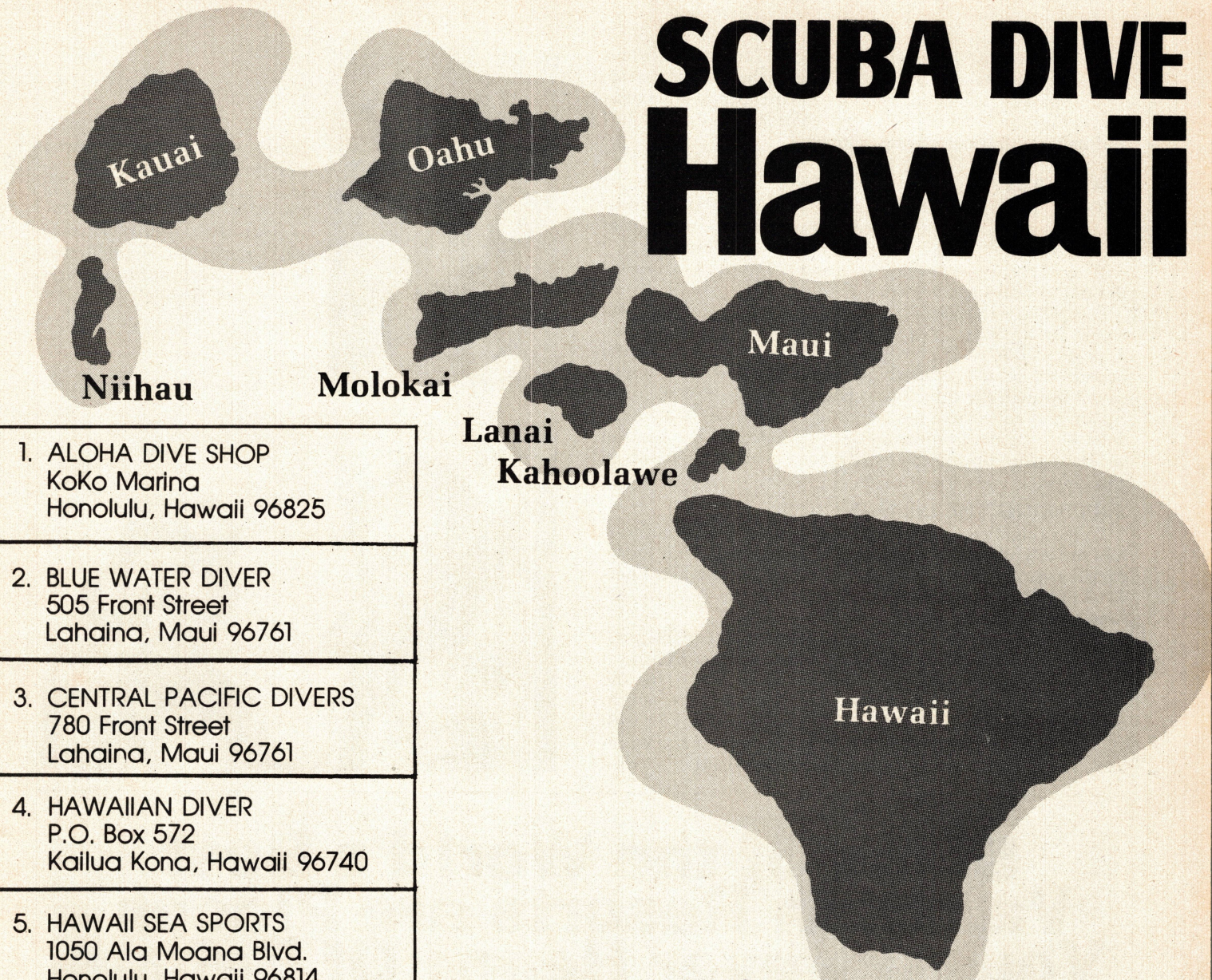
lets, toilet facilities, fresh drinking water as well as a commissary and cafeteria nearby.

The campgrounds are spread out and attractive. The tents and a few cabins (available at a slightly higher fee) are private and cannot be seen from the beach. They are cleverly spaced and concealed by forest and foliage to protect the natural look of the area. A dive shop (called the Diveshop) is located on campgrounds overlooking a crescent-shaped, powder-white beach. Here, full dive packages and charters are arranged and customers may be picked up from the beach.

The park diving concession at Cinnamon Bay is one of two operated by St. John Watersports. The other is in Cruz Bay, the closest thing to a town to be found on St. John. The immediate area is affectionately referred to as Mongoose Junction and features a rustic, charming little shopping center which houses, in addition to the dive shop, a delicatessen and a couple of small gift shops.

St. John Watersports is owned and operated by Jack Bosh and Stu Brown. Jack is a PADI instructor, and accomplished underwater photographer and a personable dive guide. Stu, his business partner, is a PADI divemaster and a most

SCUBA DIVE Hawaii



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KoKo Marina
Honolulu, Hawaii 96825

2. BLUE WATER DIVER
505 Front Street
Lahaina, Maui 96761

3. CENTRAL PACIFIC DIVERS
780 Front Street
Lahaina, Maui 96761

4. HAWAIIAN DIVER
P.O. Box 572
Kailua Kona, Hawaii 96740

5. HAWAII SEA SPORTS
1050 Ala Moana Blvd.
Honolulu, Hawaii 96814

6. KONA VILLAGE RESORT*
P.O. Box 1299
Kailua Kona, Hawaii 96740

7. SEA SAGE
4544 Kukui Street
Kapaa, Hawaii 96746

8. SKIN DIVING HAWAII
1651 Ala Moana Blvd.
Honolulu, Hawaii 96814

9. SOUTH SEAS AQUATICS
1125 Ala Moana Blvd.
Honolulu, Hawaii 96814

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*See Divers Directory Listing

SKIN DIVER OCTOBER 1978 89

knowledgeable sailing and dive guide. The accomplished staff which works with Stu and Jack helps them to offer quality dive packages, half day charters aboard speedy outboards (as yet there are no really large dive charter boats on St. John) and half and full day sailing charters.

MAHO BAY

Beyond the Cinnamon Bay Campground is Maho Bay and a small cluster of privately owned houses. Here too is a private campground not unlike the National Park at Cinnamon Bay with similar charges and facilities and the fourth location for the island's dive operations.

Past Maho is the site of one of the most scenic old sugar mill ruins. On a 1780 map of St. John, the Annaberg Plantation appears as one of 25 active sugar and rum factories on the island. St. John was discovered in 1493 when Columbus sailed through the three major islands. He claimed them for Spain, and gave them the beautiful name *Santa Ursula y Las Once Mil Virgenes* in memory of St. Ursula and her band of maidens who, during the middle ages, died at the hands of the Huns.

EXPLORING THE ISLAND

To thoroughly appreciate the total majesty of St. John visitors are encouraged to explore the mysteries of the heavy forests that still cover most of the island. An extensive network of hiking trails boldly weaves through the greenery, offering exotic nature walks.

There are several self-guided tours that can be programmed by the Office of Tourism and Visitors Bureau at Cruz Bay or at the concession at Cinnamon Bay. Along the northern and southern perimeter roads are beach after beach, each with its own panoramic view, and bay after bay with such enticing named as Rendezvous, Hawks Nest and Privateer. The inland route meanders across the island in a series



Charlie Smithline (left) prepares for a dive at the scenic Caravelle Rocks. Stu Brown (below left) and Jack Bosh (below right) are the co-owners of St. John Watersports, which serves the Virgin Islands National Park with complete diving and boating operations.



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The secluded Admiral's Arms Inn, located on South Caicos Island invites you to experience a resort designed for the scuba diving enthusiast. Built directly on the ocean overlooking some of the world's best diving spots, Admiral's Arms Inn offers you an Inn designed to provide you with a relaxed atmosphere and beautiful surroundings. The comfortable rooms and home-cooked meals make a visit to the Admiral's Arms Inn an event to remember for a lifetime. For your diving pleasure, choose from the many beautiful reefs surrounding South Caicos Island including the famous Grand Canyon Drop-Off. The Admiral's Arms Inn dive shop is also stocked with the latest equipment to make your diving vacation a pleasurable one!



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Take the Plunge at South Caicos.

of dips and crests to reveal abandoned sugar mills and estate houses sprinkled among vibrant hibiscus and bougainvillea. Trunk Bay is one of the most popular recreation areas. Orange floats in the water are part of the National Park Services self-guided snorkel trail. Underwater plaques identify various kinds of sea life that inhabit the bay much like the well publicized Buck Island Trail off St. Croix.

Transportation is necessary for most of these land tours — the best are along the north shore and centerline roads. Volkswagens and jeeps can be rented at normal rates at several car rental agencies at Cruz Bay.

THE RHONE

Our final dive was a full day's outing, arranged through Charlie Smithline, to the famous wreck of the *Rhone* off Salt Island in the British Virgins. We had at our disposal Jim Travers, a restaurant host, bon vivant and part time dive guide from St. Thomas. His 200hp, 20 foot dive boat made the 30 mile round trip a breeze in the good weather we grew to expect. I had mixed emotions about spending a full day here miles away from the island that I really came to see. Realistically, however, it is without a doubt one of the most popular excursions offered by dive operators from St. Thomas and St. John. The previously mentioned operations on St. John schedule the *Rhone* dive at least once each week.

The *Rhone*, featured in *THE DEEP*, comes by her reputation as a supreme wreck dive quite honestly. Hundreds of feet of wreckage are available for the diver to explore. The major parts of the wreck are in three sections, from 20 to 80 feet deep. The *Rhone* supports a fantastic fish population and is located in an area of generally good to excellent visibility. There are hundreds of photographic possibilities both inside and outside the wreck. Most operators make a two tank dive here, the first deep, the second shallow. An alternate dive

plan is to make one dive on the *Rhone*, then make the second dive on the way home, either at Blonde Rocks or another selected site. With lunch in between, the ride home after dive number two is just a short hop.

Getting to St. John involves taking an Eastern jet 900 miles from Miami or 1400 miles from New York into St. Thomas and then taking either an amphibian aircraft from Charlotte-amalie (St. Thomas' capitol city) or the ferry from Red Hook Bay on the eastern end of the island. By boat, St. John is 15 minutes away from St. Thomas, making it easy to visit and dive both islands.

This tiny, timeless island with its scenic bays and crystal beaches, its majestic cobalt rocks and fringing golden corals, offers much in the way of a lost paradise for modern adventurers and scuba divers. With campgrounds, a national park, a lush resort, and modern dive services. St. John Island should be soon recognized as one of the fastest growing dive spots in the Caribbean. >487

For Information

Cinnamon Bay Campgrounds
Box 120, Cruz Bay
St. John, U.S. V.I. 00830

U.S. V. I. Division of Tourism
Box 200, Cruz Bay
St. John, U.S. V. I. 00830

Caneel Bay Plantation
Box 120, Cruz Bay
Virgin Islands National Park
St. John, U.S. V. I. 00830

Maho Bay Camps Inc.
17 East 73rd St.
New York, NY 10021
or,

U.S. V. I. Division of Tourism
100 N. Biscayne Blvd., Suite 904
Miami, FL 33132

Box 113, Cruz Bay
St. John, U.S.V.I. 00830

U.S. V. I. Division of Tourism
10 Rockefeller Plaza
New York, NY 10020

St. John Watersports
Box 120, Cruz Bay
St. John, U.S.V.I. 00830

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Size ☐ XS ☐ S ☐ M ☐ L ☐ XL
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SUB-AQUA TOLL FREE HOTLINE

Sub-Aqua Specialties, Georgia's first PADI Five Star Training Facility, has recently installed a nationwide toll free "hotline" for Florida dive information. For the latest weather reports, dive site conditions and information call Sub-Aqua Specialties at 1 (800) 841-4443. In Georgia call 1 (800) 342-7156.



A complete full service dive center, Sub-Aqua Specialties provides 5000 psi air fills, equipment rentals, dive instruction, repairs, dive tours, and a heated pool where you can "try before you buy."

Sub-Aqua Specialties is located 10 miles above the Florida state line, off I-75 at 2236 Bemis Road, Valdosta, GA. For a free air fill card, call the shop's toll free number.

PLAN THE PERFECT DIVE

(Continued from Page 82)

recommend a diver bring along a pair of gloves both for protection against the coral as well as a friendly grouper's bicuspid."

And what's the really big thing among newcomers and returning divers to the Caribbean?

"One word — photography. If they don't bring an underwater camera on their first trip, I guarantee they'll have one on their second. I try to spend a lot of time with those divers who want to improve their U/W photography. It greatly expands the fun of their vacation."

True, these Caribbean waters are different — in a spectacular sort of way. To get the most from them you must plan and come prepared with the right gear. And above all, the right mental attitude.

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3311 NW 30th Ave.
Gainesville, Florida 32605

The Buccaneer

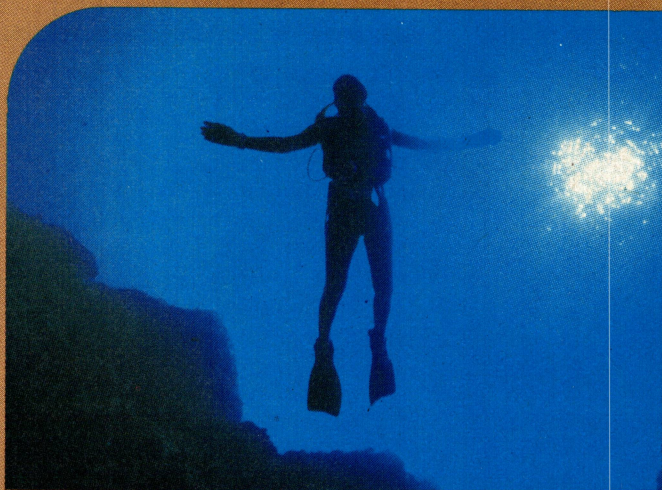
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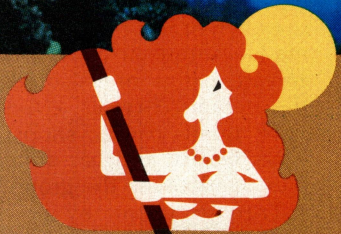
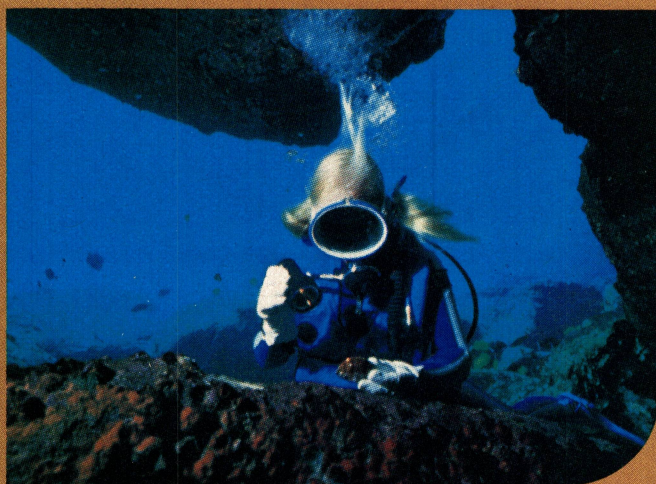
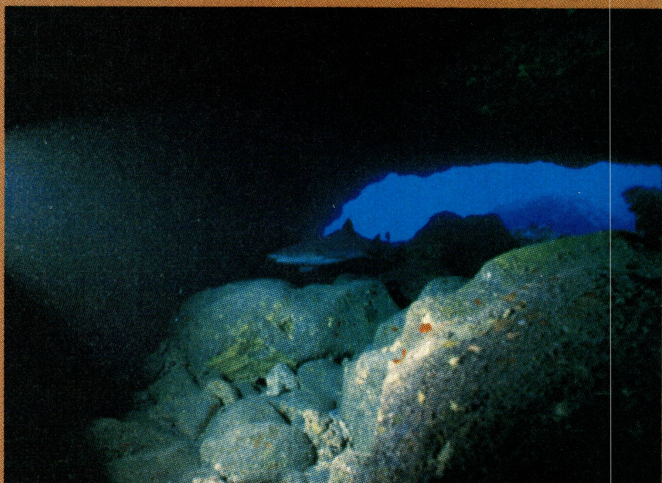
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"Bay Travel Diving Adventures announces "Africa," March 1979, group departure, 21 days. East Africa, dive the Kenya Coast, Malindi including a four day safari. The Seychelles, the Indian Ocean, dive and cruise the Amirantes on the "La Belle Vue," a 70 ft. schooner. Egypt, dive the Red Sea along with a trip to the Egyptian ruins."



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BONAIRE U/W BIOLOGY SEMINARS

Aquaventure/Habitat on the island of Bonaire has set up classroom facilities for a series of U/W biology seminars to be held there throughout the year. Formal classroom work will be conducted each day by professors of U.S. universities. Students will also have the opportunity to sport dive and to work on independent research projects.

Captain Don Stewart, owner of Aquaventure/Habitat, said, "These students are the leaders of the new wave of young people who will learn directly from the sea about Nature's important resources."

For information, contact: The Underwater Adventurers Association, 5915 W. Irving Park Road, Chicago, Illinois 60634.

CANADIAN TOURS TO COZUMEL

Suntours Ltd. has announced a new Sunflight tour to the island of Cozumel, off the coast of Mexico's Yucatan Peninsula. With accommodation at the Hotel Cozumel Caribe — for one week, based on twin occupancy — the price is \$349 per person. A dive package can be included for \$99 to \$149 per person, for three or five day dive trips on beautiful Palancar Reef. Dive trips include an instructor from Canada Scuba Schools as guide.

Beginners will receive a three hour instructional period, offshore open water experience and a two-dive boat trip with lunch on the beach. Certified divers will have two-dive boat trips daily with lunch on the beach. For both the beginner and the practiced diver, the price includes tanks, air and weightbelts. Other items, such as regulators and relevant equipment, can be rented. The Hotel Cozumel Caribe, on San Juan beach, is two miles from the town of San Miguel. All accommodations are air-conditioned with private patios or balconies facing the ocean. There is a freshwater pool, tennis courts, shops, a spacious terrace and bar-dining complex overlooking the grounds.

Transportation by private jet charter, inflight meals and bar service, transportation and luggage transfer between airport and hotel, beach bag and ticket wallet, welcome cocktail and representative service are included in the package.

Not included are hotel service charge and tax, payable to the hotel, Canadian transportation tax \$8 and Mexican airport tax \$5.

There will be four departures from Toronto: November 4th and 18th and December 2nd and 9th.

Contact: Marion Moore, Sun-tours Limited, 1470 Don Mills Rd., Don Mills, Ontario, Canada. ✉

SCUBA OPERATIONS IN SABA AND ST. EUSTATIUS

The two smallest islands in the Netherland Antilles, Saba and St. Eustatius, which are five and eight square miles respectively, now have their own resident scuba diving operations.

Saba Scuba Safari is operated by Bill McQueen, a licensed NAUI instructor formerly with Maho Watersports at Mullet Bay Beach Hotel in St. Maarten. Dive packages at \$85 per person per day include double tank dives, all dive gear, land transportation, accommodations and three meals daily at Captain's Quarters in Windwardside or Cranston's Antique Inn in the Bottom. Air fare is not included. The package, commissionable at 10 per cent, has no minimum stay requirement.

Visitors not participating in the package may arrange double tank dive trips at \$50 per day.

Recent visitors John and Caroline Kennedy pronounced Saba's diving the best they've ever done. The diving is characterized by excellent visibility (from 150 to 200 feet), drop-offs, caves, ledges and a large variety of coral and fish. The average dive is to 80 feet. No more than five divers per instructor are allowed and there are no long boat rides. For reservations, contact Bill McQueen, Saba Scuba Safari, Saba, Netherland Antilles.

The Happy Hooker Watersport Center in St. Eustatius has also opened in Oranjestad's Lower Town next to the Old Gin House. It is run by Tony Durby, formerly with Aquaventure in Bonaire. Pre-paid packages, including equipment and reef trips for six dives, are \$115. Individual guided reef trips are \$10. Snorkeling trips to reefs are \$7. Dive gear and snorkeling equipment can be rented from the center.

Deep sea fishing is \$15 per hour. Sunfish boats are \$6 per hour or \$15 per half day. And, on land, motorcycles are \$12.50 per day.

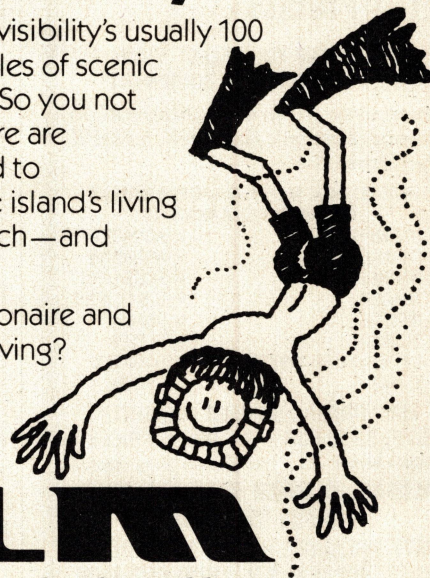
Both Saba and St. Eustatius have daily morning and afternoon flights from St. Maarten via Windward Islands Airways. ✉

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In the warm waters of Bonaire, visibility's usually 100 feet or more. Bonaire has 25 miles of scenic coastline...all of it underwater. So you not only can see more clearly...there are clearly **more** things to see. And to experience the splendor of the island's living coral reef, just step off any beach—and you're there.

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U/W SOCIETY MEETS IN ST. CROIX

The annual meeting of the officers and board of directors of the Underwater Society of America was recently held at the King Christian Hotel on St. Croix. Shown here during a cocktail party, hosted for the group by the United States Virgin Islands' Division of Tourism,



are (from left to right) Russ Thompson, president of the Underwater Society of America; Norma Parson, USVI Division of Tourism; Steve Earley, winner of the Our World-Underwater Scholarship promoted by the Society; and Lee Morris, St. Croix watersports entrepreneur who is also president-elect of the Underwater Society of America.

PADI RETAILER SEMINAR

The PADI Training Facility Program's first 1978 retailer seminar was held in San Francisco on May 15. The informative presentation was hosted by Al Hornsby, training facility director. Forty diving retailers attended. Although enrollment was limited (a number of late applicants were unfortunately turned away because of number restrictions), the program marked the largest meeting of dealers on the West Coast in several years.

Featured speaker was Jack Quinton, sporting goods advertising expert and co-designer of the PADI Advertising Seminar Series Program. The day's program dealt with a broad range of retail advertising information, from advertising budgeting to ad design and market direction in the coming decade. Also introduced was the new PADI STORE Ad Kit, a 23 page collection of camera-ready art, ad lay-outs, and logos, now available through the PADI Training Facility Program.

Capping the program was a cocktail party co-hosted by SKIN DIVER Magazine and several dive manufacturers, including Farallon/Oceanic, Scubapro, Sub Aquatic Systems, and U.S. Divers.

For further information on the remainder of the 1978 Advertising Seminar Series (nine cities across the U.S.), contact: Al Hornsby, PADI Training Facility Director, 2064 North Bush Street, Santa Ana, California 92706.

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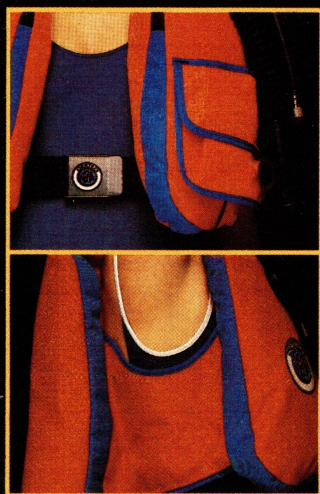
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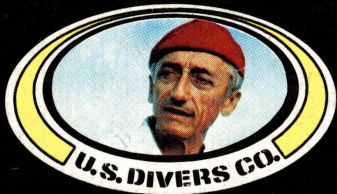
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See your Aqua-Lung® Dealer and Pages 18 and 19
of the New 1978 U. S. Divers Catalog



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